

Grade 5

Unit 6

Coordinate Geometry

Student Workbook

Name:

Name _____

Date _____

1. Circle the expression equivalent to “the sum of 3 and 2 divided by $\frac{1}{3}$.”

$$\frac{3+2}{3}$$

$$3 + (2 \div \frac{1}{3})$$

$$(3 + 2) \div \frac{1}{3}$$

$$\frac{1}{3} \div (3 + 2)$$

2. Circle the expression(s) equivalent to “28 divided by the difference between $\frac{7}{10}$ and $\frac{4}{5}$.”

$$(28 \div (\frac{4}{5} - \frac{7}{10}))$$

$$\frac{28}{\frac{7}{10} - \frac{4}{5}}$$

$$(\frac{7}{10} - \frac{4}{5}) \div 28$$

$$28 \div (\frac{7}{10} - \frac{4}{5})$$

3. Fill in the chart by writing an equivalent numerical expression.

a.	Half as much as the difference between $2\frac{1}{4}$ and $\frac{3}{8}$.	
b.	The difference between $2\frac{1}{4}$ and $\frac{3}{8}$ divided by 4.	
c.	A third of the sum of $\frac{7}{8}$ and 22 tenths.	
d.	Add 2.2 and $\frac{7}{8}$, and then triple the sum.	

4. Compare expressions 3(a) and 3(b). Without evaluating, identify the expression that is greater. Explain how you know.

5. Fill in the chart by writing an equivalent expression in word form.

a.		$\frac{3}{4} \times (1.75 + \frac{3}{5})$
b.		$\frac{7}{9} - (\frac{1}{8} \times 0.2)$
c.		$(1.75 + \frac{3}{5}) \times \frac{4}{3}$
d.		$2 \div (\frac{1}{2} \times \frac{4}{5})$

6. Compare the expressions in 5(a) and 5(c). Without evaluating, identify the expression that is less. Explain how you know.

7. Evaluate the following expressions.

a. $(9 - 5) \div \frac{1}{3}$

b. $\frac{5}{3} \times (2 \times \frac{1}{4})$

c. $\frac{1}{3} \div (1 \div \frac{1}{4})$

d. $\frac{1}{2} \times \frac{3}{5} \times \frac{5}{3}$

e. Half as much as $(\frac{3}{4} \times 0.2)$

f. 3 times as much as the quotient of 2.4 and 0.6

8. Choose an expression below that matches the story problem, and write it in the blank.

$\frac{2}{3} \times (20 - 5)$

$(\frac{2}{3} \times 20) - (\frac{2}{3} \times 5)$

$\frac{2}{3} \times 20 - 5$

$(20 - \frac{2}{3}) - 5$

- a. Farmer Green picked 20 carrots. He cooked $\frac{2}{3}$ of them and then gave 5 to his rabbits. Write the expression that tells how many carrots he had left.

Expression: _____

- b. Farmer Green picked 20 carrots. He cooked 5 of them and then gave $\frac{2}{3}$ to his rabbits. Write the expression that tells how many carrots the rabbits will get.

Expression: _____

Name _____

Date _____

1. Circle the expression equivalent to “the difference between 7 and 4, divided by a fifth.”

$7 + (4 \div \frac{1}{5})$

$\frac{7-4}{5}$

$(7 - 4) \div \frac{1}{5}$

$\frac{1}{5} \div (7 - 4)$

2. Circle the expression(s) equivalent to “42 divided by the sum of $\frac{2}{3}$ and $\frac{3}{4}$.”

$(\frac{2}{3} + \frac{3}{4}) \div 42$

$(42 \div \frac{2}{3}) + \frac{3}{4}$

$42 \div (\frac{2}{3} + \frac{3}{4})$

$\frac{42}{\frac{2}{3} + \frac{3}{4}}$

3. Fill in the chart by writing the equivalent numerical expression or expression in word form.

	Expression in word form	Numerical expression
a.	A fourth as much as the sum of $3\frac{1}{8}$ and 4.5	
b.		$(3\frac{1}{8} + 4.5) \div 5$
c.	Multiply $\frac{3}{5}$ by 5.8, then halve the product	
d.		$\frac{1}{6} \times (4.8 - \frac{1}{2})$
e.		$8 - (\frac{1}{2} \div 9)$

4. Compare the expressions in 3(a) and 3(b). Without evaluating, identify the expression that is greater. Explain how you know.

5. Evaluate the following expressions.

a. $(11 - 6) \div \frac{1}{6}$

b. $\frac{9}{5} \times (4 \times \frac{1}{6})$

c. $\frac{1}{10} \div (5 \div \frac{1}{2})$

d. $\frac{3}{4} \times \frac{2}{5} \times \frac{4}{3}$

e. 50 divided by the difference between $\frac{3}{4}$ and $\frac{5}{8}$

6. Lee is sending out 32 birthday party invitations. She gives 5 invitations to her mom to give to family members. Lee mails a third of the rest, and then she takes a break to walk her dog.

a. Write a numerical expression to describe how many invitations Lee has already mailed.

b. Which expression matches how many invitations still need to be sent out?

$$32 - 5 - \frac{1}{3}(32 - 5)$$

$$\frac{2}{3} \times 32 - 5$$

$$(32 - 5) \div \frac{1}{3}$$

$$\frac{1}{3} \times (32 - 5)$$



Lesson 32:

Interpret and evaluate numerical expressions including the language of scaling and fraction division.
Date: 11/10/13

engage^{ny}

4.H.15

A

Correct _____

Divide.

1	$1 \div 1 =$		23	$5 \div 0.1 =$	
2	$1 \div 0.1 =$		24	$0.5 \div 0.1 =$	
3	$2 \div 0.1 =$		25	$0.05 \div 0.1 =$	
4	$7 \div 0.1 =$		26	$0.08 \div 0.1 =$	
5	$1 \div 0.1 =$		27	$4 \div 0.01 =$	
6	$10 \div 0.1 =$		28	$40 \div 0.01 =$	
7	$20 \div 0.1 =$		29	$47 \div 0.01 =$	
8	$60 \div 0.1 =$		30	$59 \div 0.01 =$	
9	$1 \div 1 =$		31	$3 \div 0.1 =$	
10	$1 \div 0.1 =$		32	$30 \div 0.1 =$	
11	$10 \div 0.1 =$		33	$32 \div 0.1 =$	
12	$100 \div 0.1 =$		34	$32.5 \div 0.1 =$	
13	$200 \div 0.1 =$		35	$25 \div 5 =$	
14	$800 \div 0.1 =$		36	$2.5 \div 0.5 =$	
15	$1 \div 0.1 =$		37	$2.5 \div 0.05 =$	
16	$1 \div 0.01 =$		38	$3.6 \div 0.04 =$	
17	$2 \div 0.01 =$		39	$32 \div 0.08 =$	
18	$9 \div 0.01 =$		40	$56 \div 0.7 =$	
19	$5 \div 0.01 =$		41	$77 \div 1.1 =$	
20	$50 \div 0.01 =$		42	$4.8 \div 0.12 =$	
21	$60 \div 0.01 =$		43	$4.84 \div 0.4 =$	
22	$20 \div 0.01 =$		44	$9.63 \div 0.03 =$	

B

Improvement _____ # Correct _____

Divide.

1	$10 \div 1 =$		23	$4 \div 0.1 =$	
2	$1 \div 0.1 =$		24	$0.4 \div 0.1 =$	
3	$2 \div 0.1 =$		25	$0.04 \div 0.1 =$	
4	$8 \div 0.1 =$		26	$0.07 \div 0.1 =$	
5	$1 \div 0.1 =$		27	$5 \div 0.01 =$	
6	$10 \div 0.1 =$		28	$50 \div 0.01 =$	
7	$20 \div 0.1 =$		29	$53 \div 0.01 =$	
8	$70 \div 0.1 =$		30	$68 \div 0.01 =$	
9	$1 \div 1 =$		31	$2 \div 0.1 =$	
10	$1 \div 0.1 =$		32	$20 \div 0.1 =$	
11	$10 \div 0.1 =$		33	$23 \div 0.1 =$	
12	$100 \div 0.1 =$		34	$23.6 \div 0.1 =$	
13	$200 \div 0.1 =$		35	$15 \div 5 =$	
14	$900 \div 0.1 =$		36	$1.5 \div 0.5 =$	
15	$1 \div 0.1 =$		37	$1.5 \div 0.05 =$	
16	$1 \div 0.01 =$		38	$3.2 \div 0.04 =$	
17	$2 \div 0.01 =$		39	$28 \div 0.07 =$	
18	$7 \div 0.01 =$		40	$42 \div 0.6 =$	
19	$4 \div 0.01 =$		41	$88 \div 1.1 =$	
20	$40 \div 0.01 =$		42	$3.6 \div 0.12 =$	
21	$50 \div 0.01 =$		43	$3.63 \div 0.3 =$	
22	$80 \div 0.01 =$		44	$8.44 \div 0.04 =$	


COMMON
CORE

Lesson 33:

Create story contexts for numerical expressions and tape diagrams, and solve word problems.

Date:

11/10/13

engage^{ny}

4.H.25

Name _____

Date _____

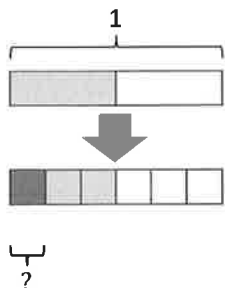
1. Ms. Hayes has $\frac{1}{2}$ liter of juice. She distributes it equally to 6 students in her tutoring group.
 - a. How many liters of juice does each student get?
 - b. How many more liters of juice will Ms. Hayes need, if she wants to give each of the 24 students in her class the same amount of juice found in Part (a)?
2. Lucia has 3.5 hours left in her workday as a car mechanic. Lucia needs $\frac{1}{2}$ of an hour to complete one oil change.
 - a. How many oil changes can Lucia complete during the rest of her workday?
 - b. Lucia can complete two car inspections in the same amount of time it takes her to complete one oil change. How long does it take her to complete one car inspection?
 - c. How many inspections can she complete in the rest of her workday?

3. Carlo buys \$14.40 worth of grapefruit. Each grapefruit cost \$0.80.
- How many grapefruit does Carlo buy?
 - At the same store, Kahri spends one-third as much money on grapefruit as Carlo. How many grapefruit does she buy?
4. Studies show that a typical giant hummingbird can flap its wings once in 0.08 of a second.
- While flying for 7.2 seconds, how many times will a typical giant hummingbird flap its wings?
 - A ruby-throated hummingbird can flap its wings 4 times faster than a giant hummingbird. How many times will a ruby-throated hummingbird flap its wings in the same amount of time?

5. Create a story context for the following expression.

$$\frac{1}{3} \times (\$20 - \$3.20)$$

6. Create a story context about painting a wall for the following tape diagram.



Name _____

Date _____

1. Chase volunteers at an animal shelter after school, feeding and playing with the cats.
 - a. If he can make 5 servings of cat food from a third of a kilogram of food, how much does one serving weigh?
 - b. If Chase wants to give this same serving size to each of 20 cats, how many kilograms of food will he need?
2. Anouk has 4.75 pounds of meat. She uses a quarter pound of meat to make one hamburger.
 - a. How many hamburgers can Anouk make with the meat she has?
 - b. Sometimes Anouk makes sliders. Each slider is half as much meat as is used for a regular hamburger. How many sliders could Anouk make with the 4.75 pounds?



Lesson 33:

Date:

Create story contexts for numerical expressions and tape diagrams, and solve word problems.

11/10/13

engage^{ny}

4.H.30

3. Ms. Geronimo has a \$10 gift certificate to her local bakery.
- a. If she buys a slice of pie for \$2.20 and uses the rest of the gift certificate to buy chocolate macaroons that cost \$0.60 each, how many macaroons can Ms. Geronimo buy?

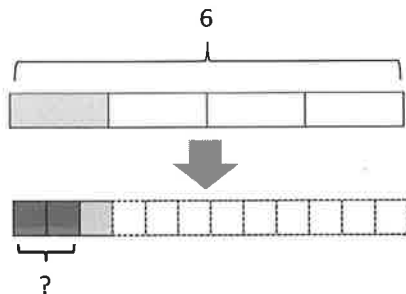
- b. If she changes her mind and instead buys a loaf of bread for \$4.60 and uses the rest to buy cookies that cost $1\frac{1}{2}$ times as much as the macaroons, how many cookies can she buy?

4. Create a story context for the following expressions.

a. $(5\frac{1}{4} - 2\frac{1}{8}) \div 4$

b. $4 \times (\frac{4.8}{0.8})$

5. Create a story context for the following tape diagram.



Name _____

Date _____

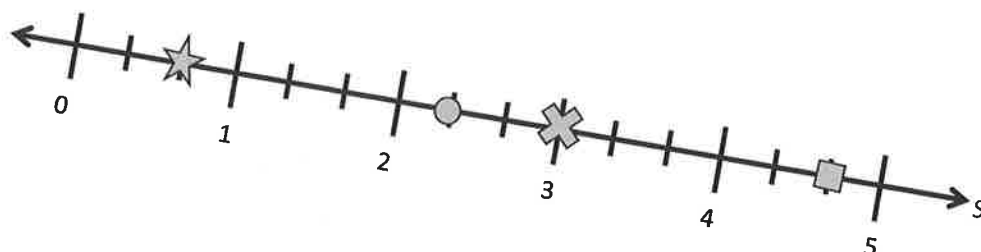
1. Each shape was placed at a point on the number line S . Give the coordinate of each point below.

a. ✕ _____

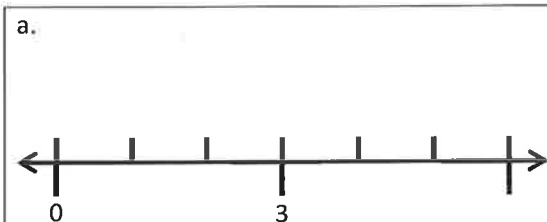
b. ★ _____

c. ● _____

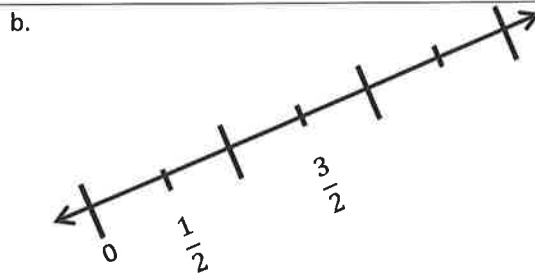
d. ■ _____



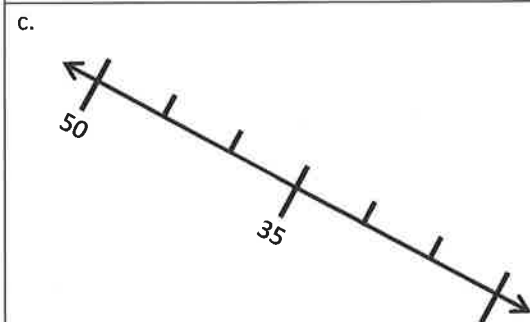
2. Plot the points on the number lines.



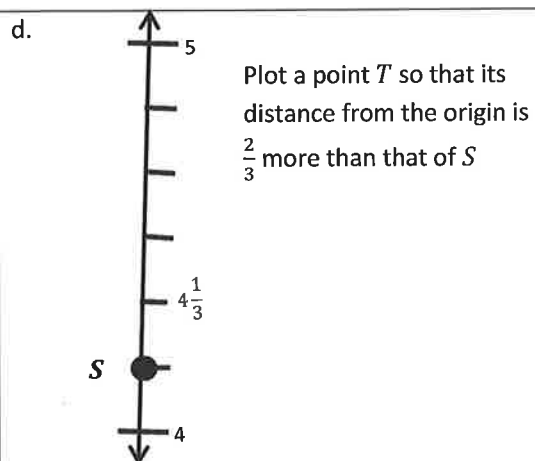
Plot A so its distance from the origin is 2.



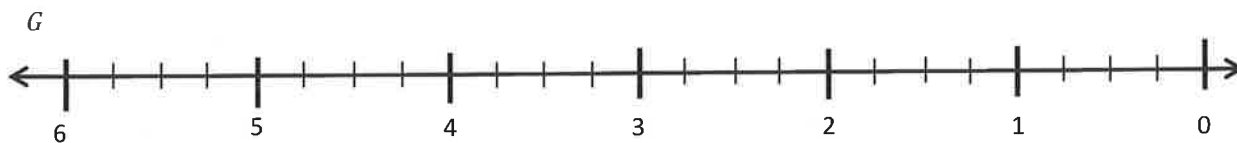
Plot R so that its distance from the origin is $\frac{5}{2}$.



Plot L so its distance from the origin is 20

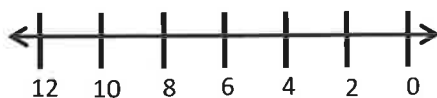


3. Number line G is labeled from 0 to 6. Use number line G below, to answer the questions.



- Plot point A at $\frac{3}{4}$.
- Label a point that lies at $4\frac{1}{2}$ as B .
- Label a point, C , whose distance from zero is 5 more than that of A .
The coordinate of C is _____.
- Plot a point, D , whose distance from zero is $1\frac{1}{4}$ less than that of B .
The coordinate of D is _____.
- The distance of E from zero is $1\frac{3}{4}$ more than that of D . Plot point E .
- What is the coordinate of the point that lies halfway between A and D ?
Label this point F .

4. Mrs. Fan asked her fifth-grade class to create a number line. Lenox created the number line below:



Parks said Lenox's number line is wrong because numbers should always increase from left to right. Who is correct? Explain your thinking.

5. A pirate marked the palm tree on his treasure map and buried his treasure 30 feet away. Do you think he'll be able to easily find his treasure when he returns? Why or why not? What might he do to make it easier to find?

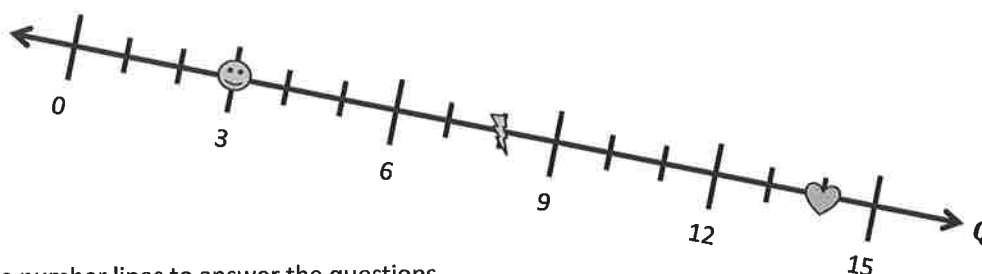


Name _____

Date _____

1. Answer the following questions using number line Q , below.

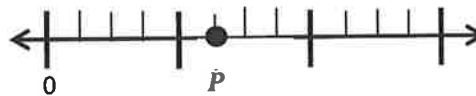
- What is the coordinate, or the distance from the origin, of the ● ? _____
- What is the coordinate of ⚡ ? _____
- What is the coordinate of ♥ ? _____
- What is the coordinate at the midpoint of ⚡ and ♥ ? _____



2. Use the number lines to answer the questions.

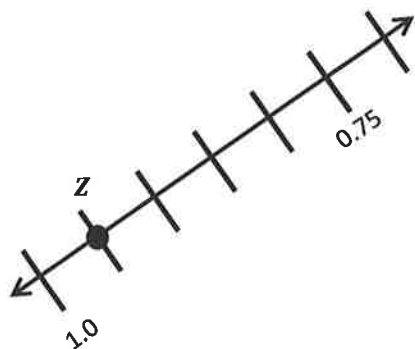


Plot T so its distance from the origin is 10.

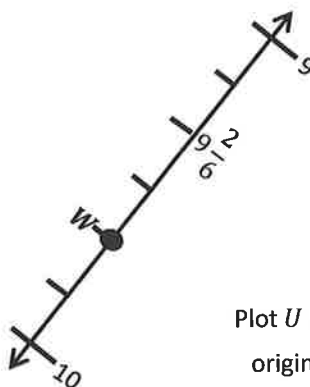


Plot M so its distance is $\frac{11}{4}$ from the origin.

What is the distance from P to M ?

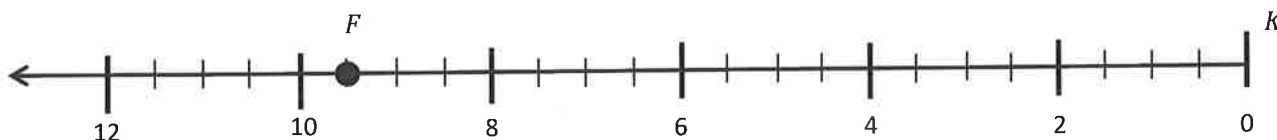


Plot a point that is 0.15 closer to the origin than Z .



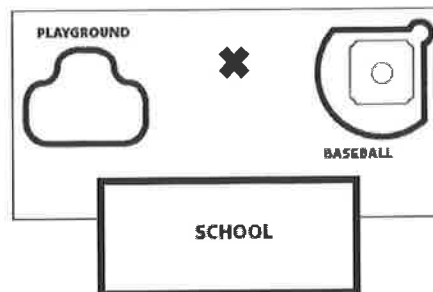
Plot U so that its distance from the origin is $\frac{3}{6}$ closer than that of W .

3. Number line K shows 12 units. Use number line K , below, to answer the questions.



- Plot a point at 1. Label it A .
- Label a point that lies at $3\frac{1}{2}$ as B .
- Label a point, C , whose distance from zero is 8 units farther than that of B .
The coordinate of C is _____.
- Plot a point, D , whose distance from zero is $\frac{6}{2}$ closer to zero than B .
The coordinate of D is _____.
- What is the coordinate of the point that lies $\frac{17}{2}$ farther from the origin than D ?
Label this point E .
- What is the coordinate of the point that lies halfway between F and D ?
Label this point G .

4. Mr. Baker's fifth-grade class buried a time capsule in the field behind the school. They drew a map and marked the location of the capsule with an X so his class can dig it up in ten years. What could Mr. Baker have done to make the capsule easier to find?

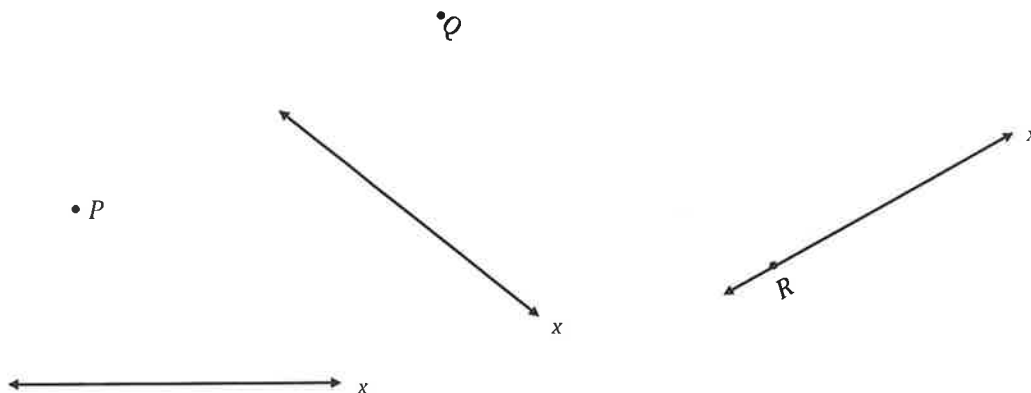


Name _____

Date _____

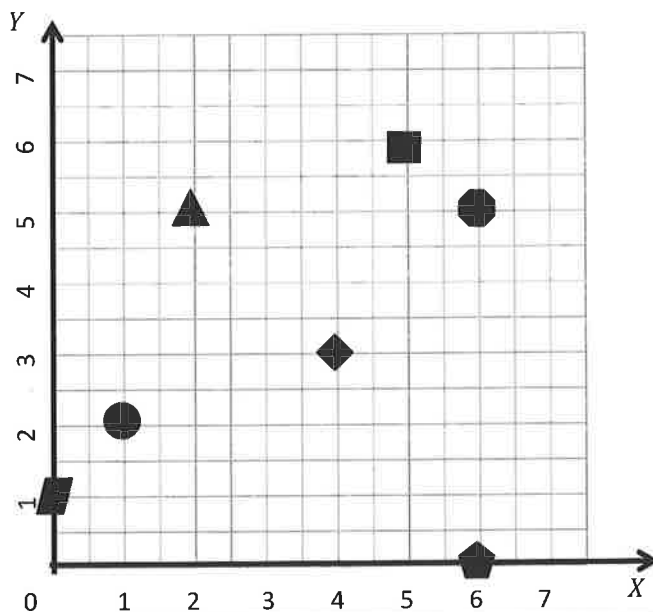
1.

- a. Use a set square to draw a line perpendicular to the x -axis through points P , Q , and R . Label the new line as the y -axis.



- b. Choose one of the sets of perpendicular lines above and create a coordinate plane. Mark 7 units on each axis and label as whole numbers.

2. Use the coordinate plane to answer.

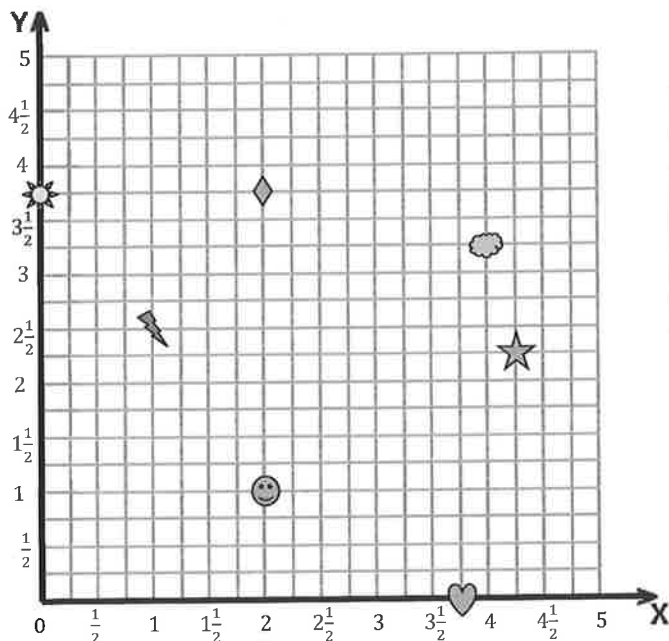


- a. Tell the shape at each location.

x -coordinate	y -coordinate	Shape
2	5	
1	2	
5	6	
6	5	

- b. Which shape is 2 units from the y -axis?
- c. Which shape has an x -coordinate of 0?
- d. Which shape is 4 units from the y -axis and 3 units from the x -axis?

3. Use the coordinate plane to answer.



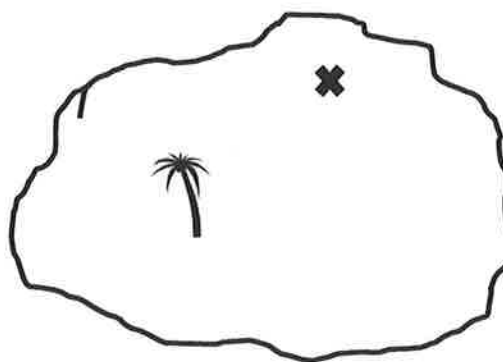
a. Fill in the blanks.

Shape	x-coordinate	y-coordinate
Smiley Face		
Diamond		
Sun		
Heart		

b. Name the shape whose x -coordinate is $\frac{1}{2}$ unit more than the heart's x -coordinate.

c. Plot a triangle at $(3, 4)$. d. Plot a square at $(4\frac{3}{4}, 5)$. e. Plot an X at $(\frac{1}{2}, \frac{3}{4})$.

4. The pirate's treasure is buried at the X on the map. How could a coordinate plane make describing its location easier?

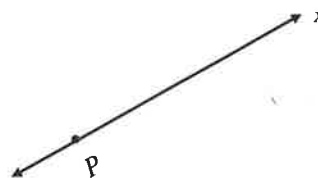


Name _____

Date _____

1.

- a. Use a set-square to draw a line perpendicular to the x -axis through point P . Label the new line as the y -axis.



- b. Choose one of the sets of perpendicular lines above and create a coordinate plane. Mark 5 units on each axis, and label them as whole numbers.

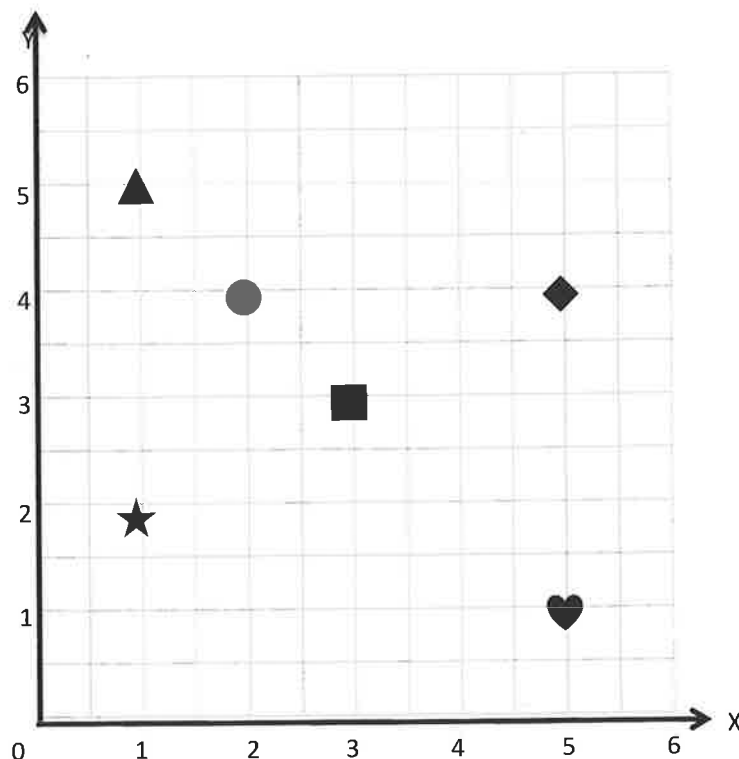
2. Use the coordinate plane to answer.

- a. Name the shape at each location.

x -coordinate	y -coordinate	Shape
2	4	
5	4	
1	5	
5	1	

- b. Which shape is 2 units from the x -axis?

- c. Which shape has the same x - and y -coordinate?



3. Use the coordinate plane to answer.

a. Name the coordinates of each shape.

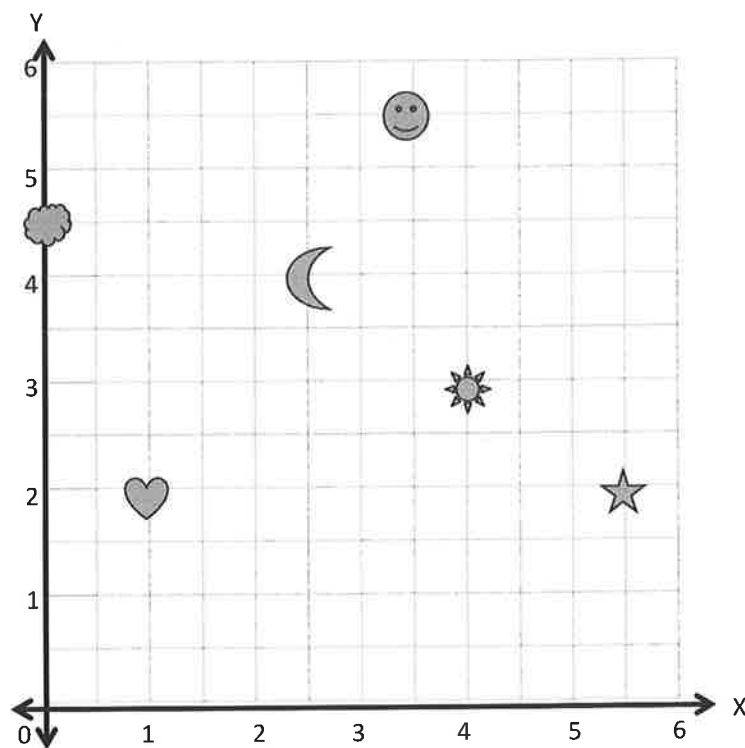
Shape	x-coordinate	y-coordinate
Moon		
Sun		
Heart		
Cloud		
Smiley Face		

b. Which 2 shapes have the same y-coordinate?

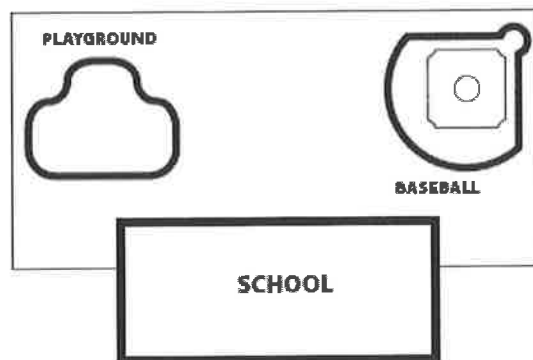
c. Plot an X at (2, 3).

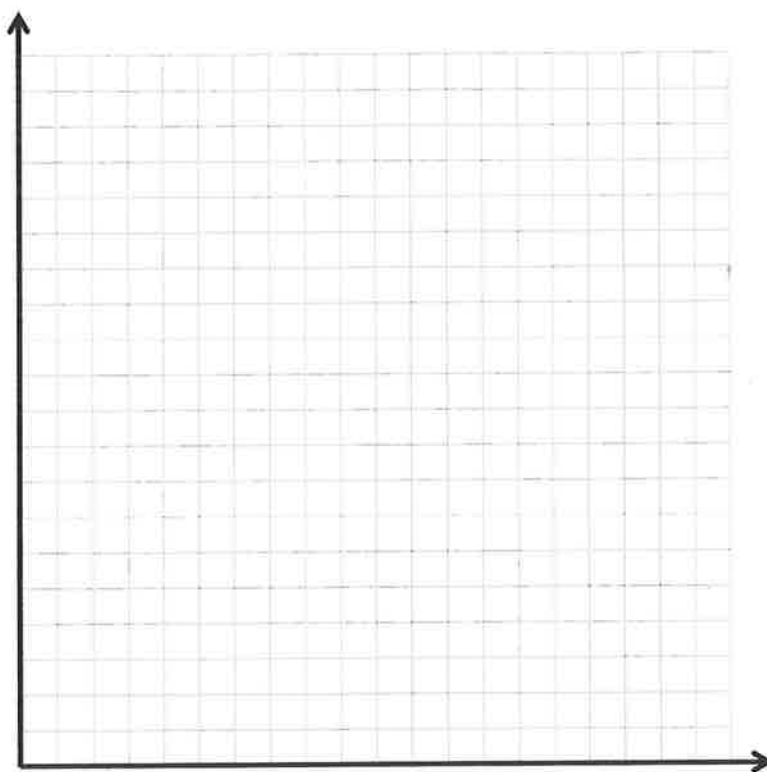
d. Plot a square at $(3, 2\frac{1}{2})$.

e. Plot a triangle at $(6, 3\frac{1}{2})$.



4. Mr. Palmer plans to bury a time capsule 10 yards behind the school. What else should he do to make naming the location of the time capsule more accurate?

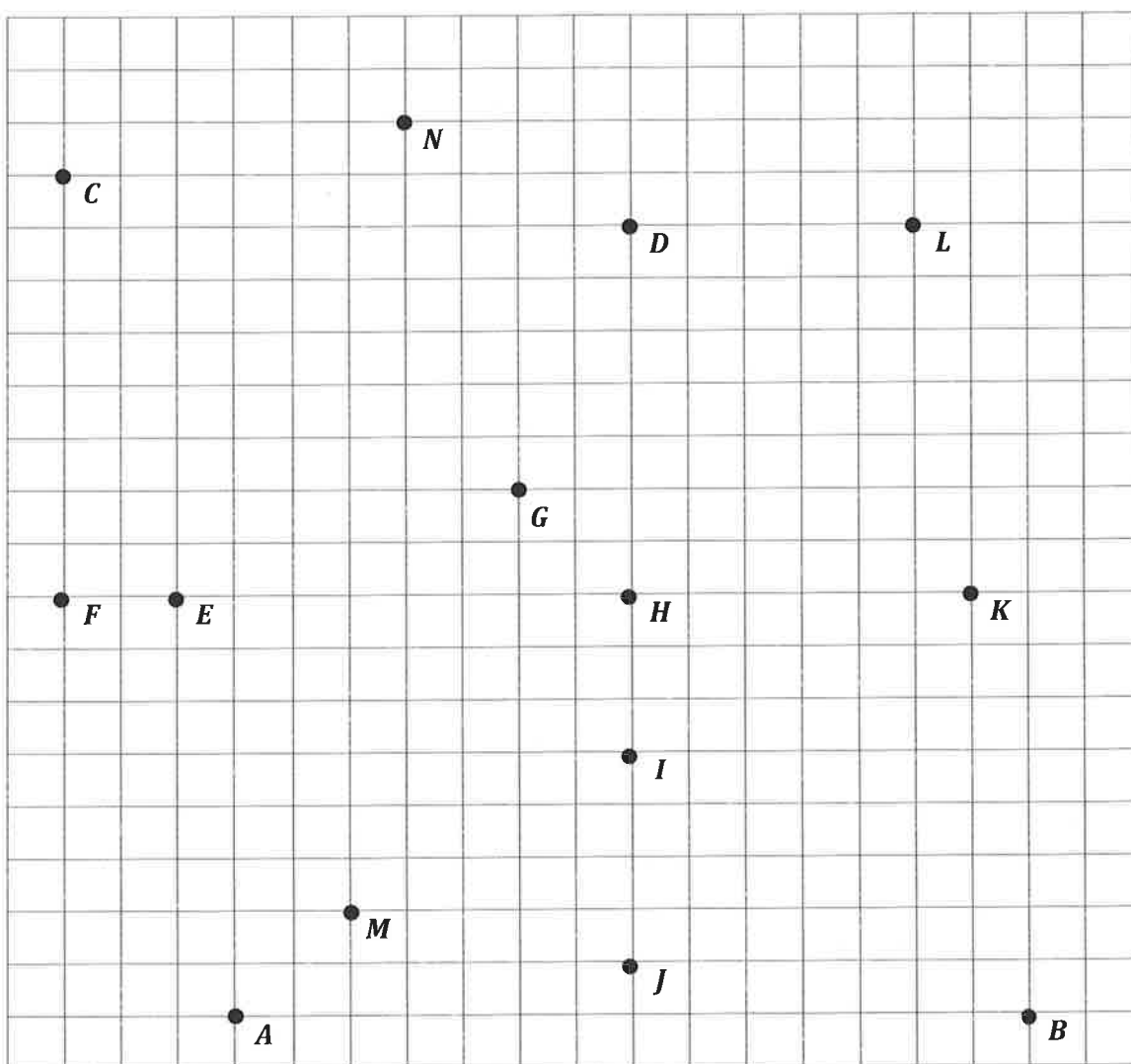




Name _____

Date _____

1. Use the grid below, to complete the following tasks.
 - a. Construct an x -axis that passes through points A and B .
 - b. Construct a perpendicular y -axis that passes through points C and F .
 - c. Label the origin as 0.
 - d. The x -coordinate of B is $5\frac{2}{3}$. Label the whole numbers along the x -axis.
 - e. The y -coordinate of C is $5\frac{1}{3}$. Label the whole numbers.



2. For all of the following problems, consider the points A through N on the previous page.

- Identify all of the points that have an x -coordinate of $3\frac{1}{3}$.
- Identify all of the points that have a y -coordinate of $2\frac{2}{3}$.
- Which point is $3\frac{1}{3}$ units above the x -axis **and** $2\frac{2}{3}$ units to the right of the y -axis? Name the point and give its coordinate pair.
- Which point is located $5\frac{1}{3}$ units from the y -axis?
- Which point is located $1\frac{2}{3}$ units along the x -axis?
- Give the coordinate pair for each of the following points.

K : _____ I : _____ B : _____ C : _____

- Name the points located at the following coordinates.

$(1\frac{2}{3}, \frac{2}{3})$ _____ $(0, 2\frac{2}{3})$ _____ $(1, 0)$ _____ $(2, 5\frac{2}{3})$ _____

- Which point has an equal x - and y -coordinate? _____
- Give the coordinates for the intersection of the two axes. _____ Another name for this point on the plane is the _____.
- Plot the following points.

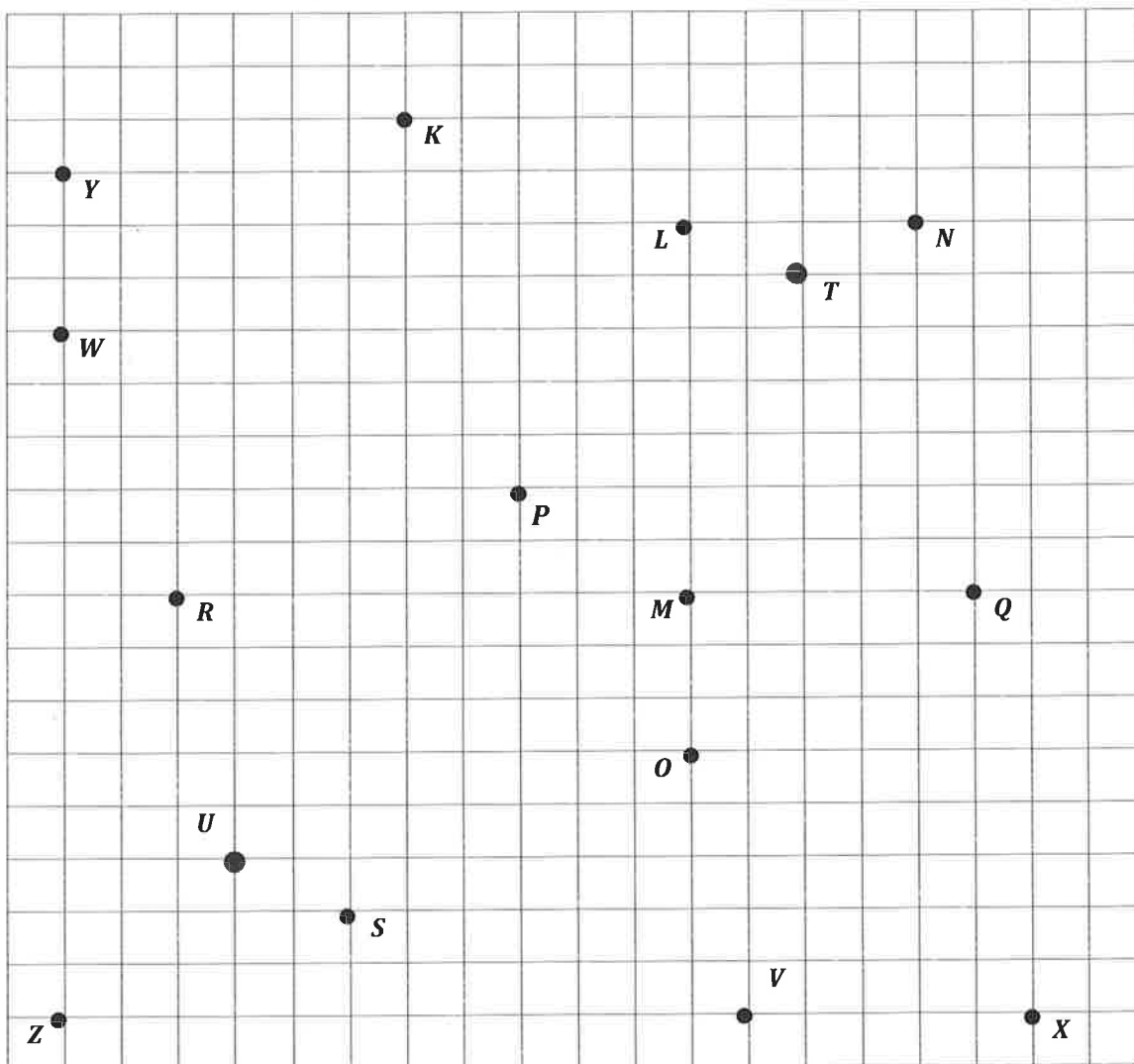
P : $(4\frac{1}{3}, 4)$ Q : $(\frac{1}{3}, 6)$ R : $(4\frac{2}{3}, 1)$ S : $(0, 1\frac{2}{3})$

- What is distance between E and H , or EH ?
- What is the length HD ?
- Would the length ED be greater or less than $EH + HD$?
- Jack was absent when the teacher explained how to describe the location of a point on the coordinate plane. Explain it to him using point J .

Name _____

Date _____

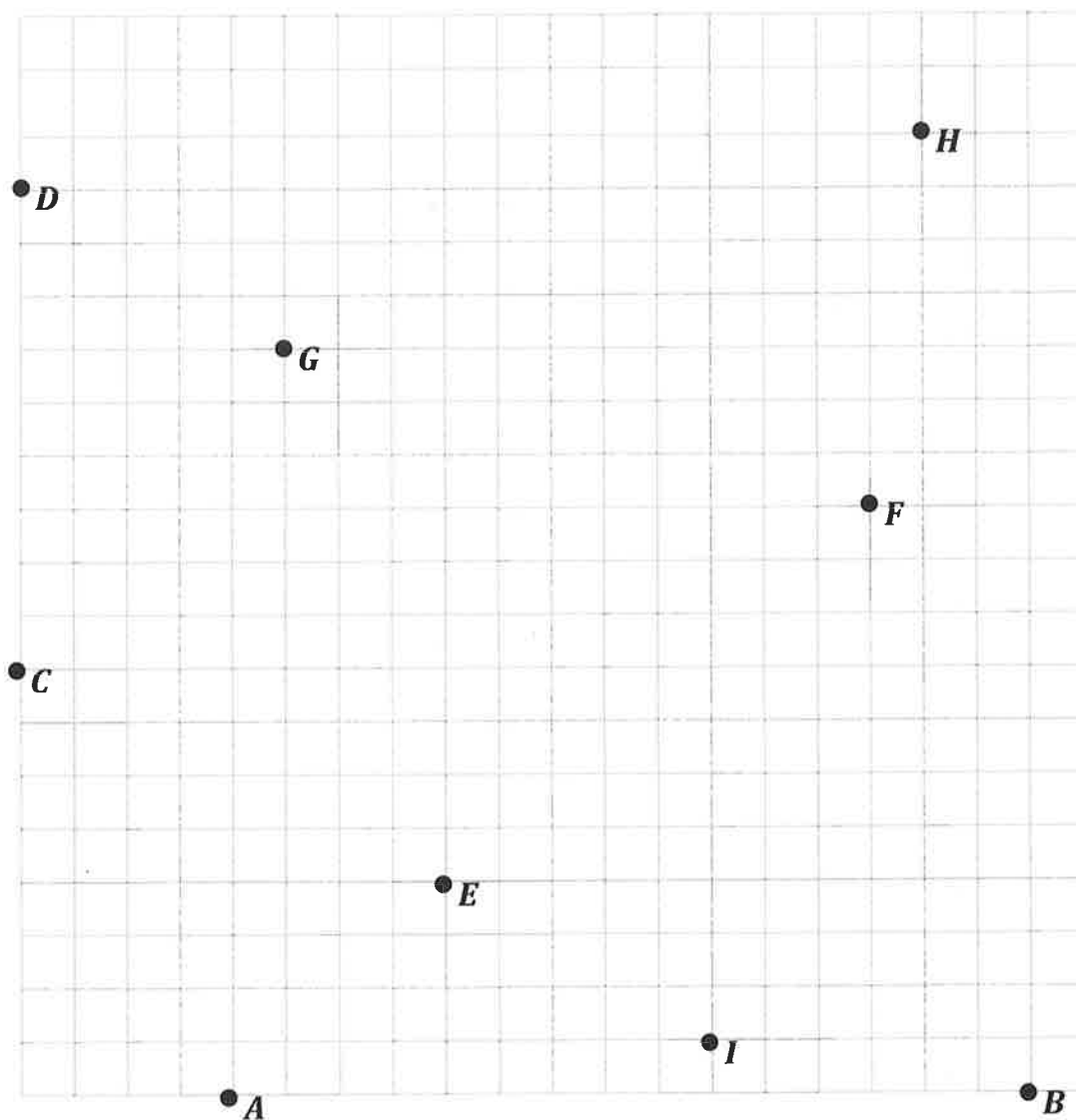
1. Use the grid below to complete the following tasks.
 - a. Construct a y -axis that passes through points Y and Z .
 - b. Construct a perpendicular x -axis that passes through points Z and X .
 - c. Label the origin as O .
 - d. The y -coordinate of W is $2\frac{3}{5}$. Label the whole numbers along the y -axis.
 - e. The x -coordinate of V is $2\frac{2}{5}$. Label the whole numbers.



2. For all of the following problems, consider the points K through X on the previous page.

- Identify all of the points that have a y -coordinate of $1\frac{3}{5}$.
- Identify all of the points that have an x -coordinate of $2\frac{1}{5}$.
- Which point is $1\frac{3}{5}$ units above the x -axis *and* $3\frac{1}{5}$ units to the right of the y -axis? Name the point and give its coordinate pair.
- Which point is located $1\frac{1}{5}$ units from the y -axis?
- Which point is located $\frac{2}{5}$ units along the x -axis?
- Give the coordinate pair for each of the following points.
 T : _____ U : _____ S : _____ K : _____
- Name the points located at the following coordinates.
 $(\frac{2}{5}, \frac{3}{5})$ _____ $(3\frac{2}{5}, 0)$ _____ $(2\frac{1}{5}, 3)$ _____ $(0, 2\frac{3}{5})$ _____
- Plot a point whose x - and y -coordinates are equal. Label your point E .
- What is the name for the point on the plane where the two axes intersect? _____ Give the coordinates for this point. _____
- Plot the following points.
 A : $(1\frac{1}{5}, 1)$ B : $(\frac{1}{5}, 3)$ C : $(2\frac{4}{5}, 2\frac{2}{5})$ D : $(1\frac{1}{5}, 0)$
- What is the distance between L and N , or LN ?
- What is the distance MQ ?
- Would RM be greater, less than, or equal to $LN + MQ$?
- Leslie was explaining how to plot points on the coordinate plane to a new student, but she left off some important information. Correct her explanation so that it is complete.

“All you have to do is read the coordinates; for example, if it says $(4, 7)$, count four, then seven, and put a point where the two grid lines intersect.”



Battleship Rules

Goal: To sink all of your opponent's ships by correctly guessing their coordinates.

Materials

- Each player gets 1 grid sheet(per game)
- Red crayon/marker for hits
- Black crayon/marker for misses
- Folder to place between players

Ships

- Each player must mark 5 ships on the grid.
 - Aircraft Carrier – Plot 5 points
 - Battleship – Plot 4 points
 - Cruiser – Plot 3 points
 - Submarine – Plot 3 points
 - Patrol Boat – Plot 2 points

Setup

- With your opponent, choose a unit length and fractional unit for the coordinate plane.
- Label chosen units on both grid sheets.
- Secretly select locations for each of the 5 ships on your My Ships grid.
 - All ships must be placed horizontally or vertically on the coordinate plane.
 - Ships can touch each other, but may not occupy the same coordinate.

Play

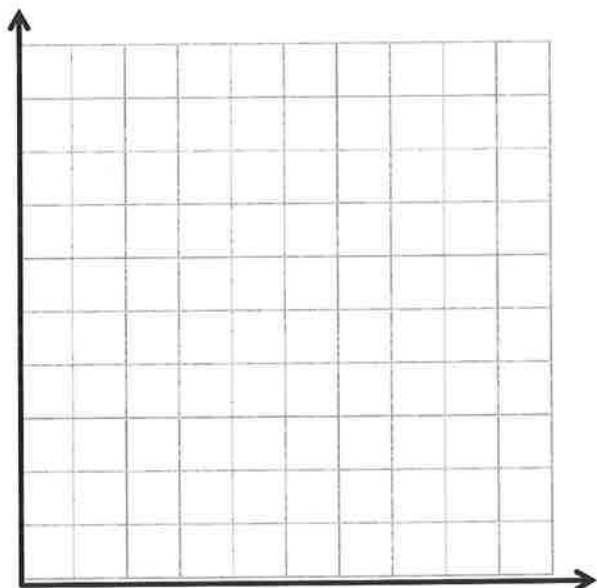
- Players take turns firing one shot to attack enemy ships.
- On your turn, call out the coordinates of your attacking shot. Record the coordinates of each attack shot.
- Your opponent checks his My Ships grid. If that coordinate is unoccupied, he says, "Miss." If you named a coordinate occupied by a ship, he says, "Hit."
- Mark each attempted shot on your Enemy Ships grid. Mark a black ✕ on the coordinate if your opponent says, "Miss." Mark a red ✓ on the coordinate if your opponent says, "Hit."
- On your opponent's turn, if he hits one of your ships, mark a red ✓ on that coordinate of your My Ships grid. When one of your ships has every coordinate marked with a ✓, say, "You've sunk my [name of ship]."

Victory

- The first player to sink all (or the most) opposing ships wins.

My Ships

- Draw a red ✓ over any coordinate your opponent hits.
- Once all of the coordinates of any ship have been hit, say, “You’ve sunk my [name of ship].”



aircraft carrier – 5 points
battleship – 4 points
cruiser – 3 points
submarine – 3 points
patrol boat – 2 points

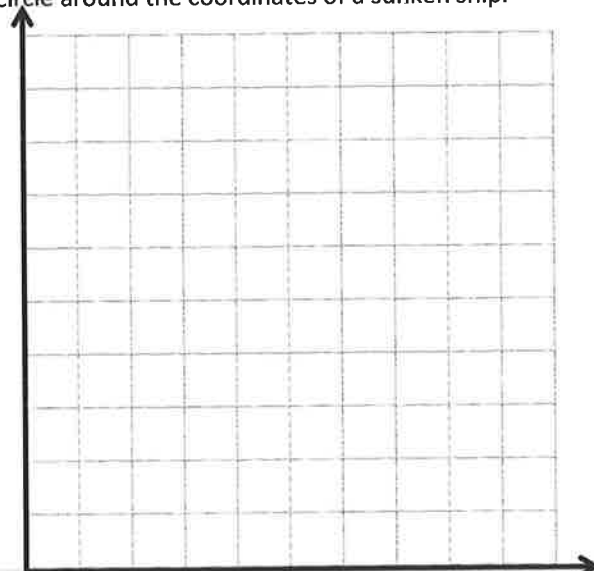
Enemy Ships

- Draw a black ✕ on the coordinate if your opponent says, “Miss.”
- Draw a red ✓ on the coordinate if your opponent says, “Hit.”
- Draw a circle around the coordinates of a sunken ship.

Attack Shots

- Record the coordinates of each shot below and whether it was a ✓ (hit) or a ✕ (miss).

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____



Name _____

Date _____

Your homework is to play at least one game of *Battleship* with a friend or family member. You can use the directions from class to teach your opponent. You and your opponent should record your guesses, hits, and misses on the sheet as you did in class.

When you have finished your game, answer these questions.

1. When you guess a point that is a hit, how do you decide which points to guess next?
2. How could you change the coordinate plane to make the game easier or more challenging?
3. Which strategies worked best for you when playing this game?

Name _____

Date _____

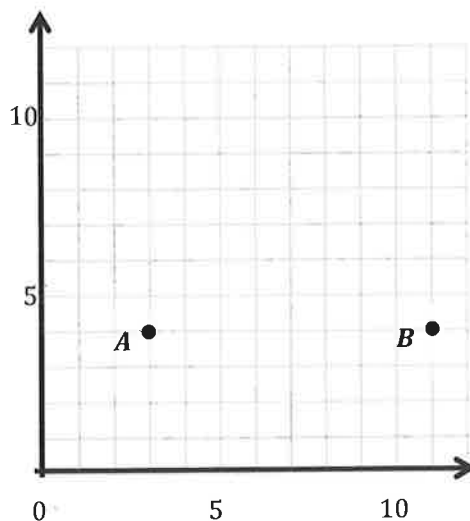
1. Use the coordinate plane below to answer the following questions.

- Use a straightedge to construct a line that goes through points A and B . Label the line e .
- Line e is parallel to the _____-axis and is perpendicular to the _____-axis.
- Plot two more points on line e . Name them C and D .
- Give the coordinates of each point below.

A : _____ B : _____

C : _____ D : _____

- What do all of the points of line e have in common?



- Give the coordinates of another point that would fall on line e with an x -coordinate greater than 15.

2. Plot the following points on the coordinate plane to the right.

P : $(1\frac{1}{2}, \frac{1}{2})$ Q : $(1\frac{1}{2}, 2\frac{1}{2})$

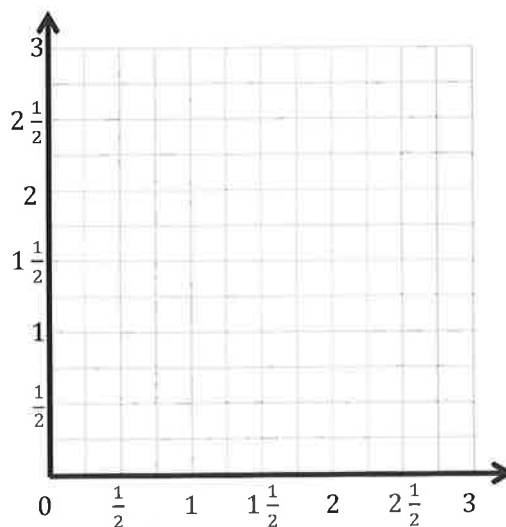
R : $(1\frac{1}{2}, 1\frac{1}{4})$ S : $(1\frac{1}{2}, \frac{3}{4})$

- Use a straightedge to draw a line to connect these points. Label the line h .
- In line h , $x = \underline{\hspace{1cm}}$ for all values of y .
- Circle the correct word.

Line h is *parallel* *perpendicular* to the x -axis.

Line h is *parallel* *perpendicular* to the y -axis.

- What pattern occurs in the coordinate pairs that let you know that line h is vertical?



3. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the x -axis? Circle your answer(s). Without plotting them, explain how you know.

a. (1.4, 2.2) and (4.1, 2.4) b. (3, 9) and (8, 9) c. $(1\frac{1}{4}, 2)$ and $(1\frac{1}{4}, 8)$

4. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the y -axis? Circle your answer(s). Then, give 2 other coordinate pairs that would also fall on this line.

a. (4, 12) and (6, 12) b. $(\frac{3}{5}, 2\frac{3}{5})$ and $(\frac{1}{5}, 3\frac{1}{5})$ c. (0.8, 1.9) and (0.8, 2.3)

5. Write the coordinate pairs of 3 points that can be connected to construct a line that is $5\frac{1}{2}$ units to the right of and parallel to the y -axis.

a. _____ b. _____ c. _____

6. Write the coordinate pairs of 3 points that lie on the x -axis.

a. _____ b. _____ c. _____

7. Adam and Janice are playing *Battleship*. Presented in the table is a record of Adam's guesses so far.

He has hit Janice's battleship using these coordinate pairs. What should he guess next? How do you know? Explain, using words and pictures.

(3, 11)	hit
(2, 11)	miss
(3, 10)	hit
(4, 11)	miss
(3, 9)	miss

Name _____

Date _____

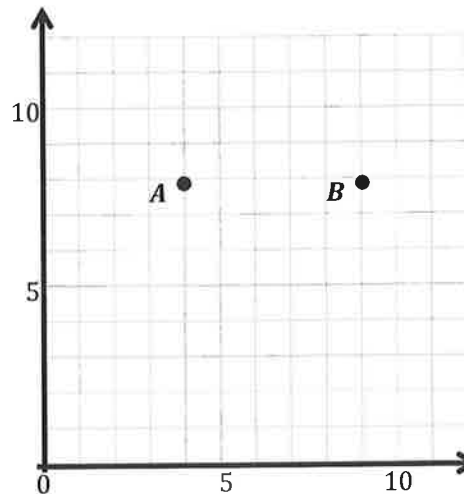
1. Use the coordinate plane to answer the questions.

- Use a straightedge to construct a line that goes through points A and B . Label the line g .
- Line g is parallel to the _____-axis and is perpendicular to the _____-axis.
- Draw two more points on line g . Name them C and D .
- Give the coordinates of each point below.

A : _____ B : _____

C : _____ D : _____

- What do all of the points on line g have in common?



- Give the coordinates of another point that falls on line g with an x -coordinate greater than 25.

2. Plot the following points on the coordinate plane to the right.

$H: (\frac{3}{4}, 3)$

$I: (\frac{3}{4}, 2\frac{1}{4})$

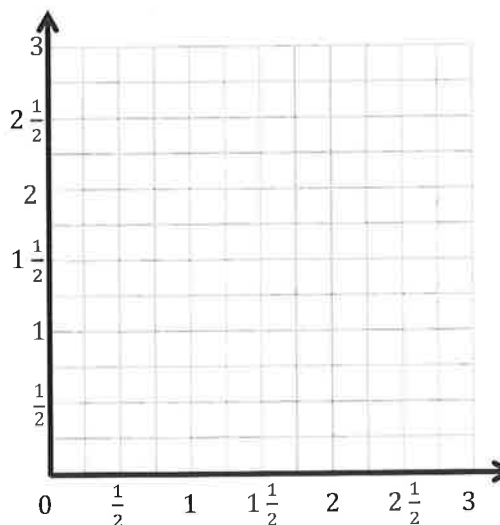
$J: (\frac{3}{4}, \frac{1}{2})$

$K: (\frac{3}{4}, 1\frac{3}{4})$

- Use a straightedge to draw a line to connect these points. Label the line f .
- In line f , $x =$ _____ for all values of y .
- Circle the correct word:

Line f is *parallel* *perpendicular* to the x -axis.

Line f is *parallel* *perpendicular* to the y -axis.



- What pattern occurs in the coordinate pairs that make line f vertical?

3. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the x -axis? Circle your answer(s). Without plotting them, explain how you know.

a. $(3.2, 7)$ and $(5, 7)$ b. $(8, 8.4)$ and $(8, 8.8)$ c. $(6\frac{1}{2}, 12)$ and $(6.2, 11)$

4. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the y -axis? Circle your answer(s). Then, give 2 other coordinate pairs that would also fall on this line.

a. $(3.2, 8.5)$ and $(3.22, 24)$ b. $(13\frac{1}{3}, 4\frac{2}{3})$ and $(13\frac{1}{3}, 7)$ c. $(2.9, 5.4)$ and $(7.2, 5.4)$

5. Write the coordinate pairs of 3 points that can be connected to construct a line that is $5\frac{1}{2}$ units to the right of and parallel to the y -axis.

a. _____ b. _____ c. _____

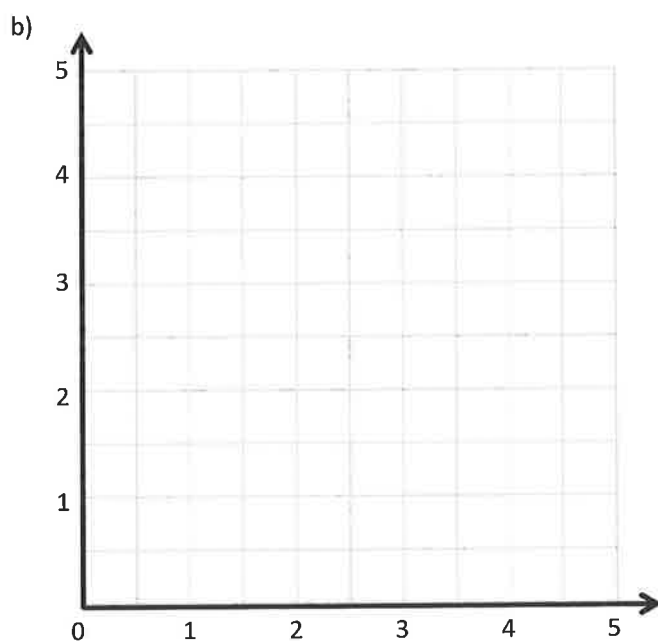
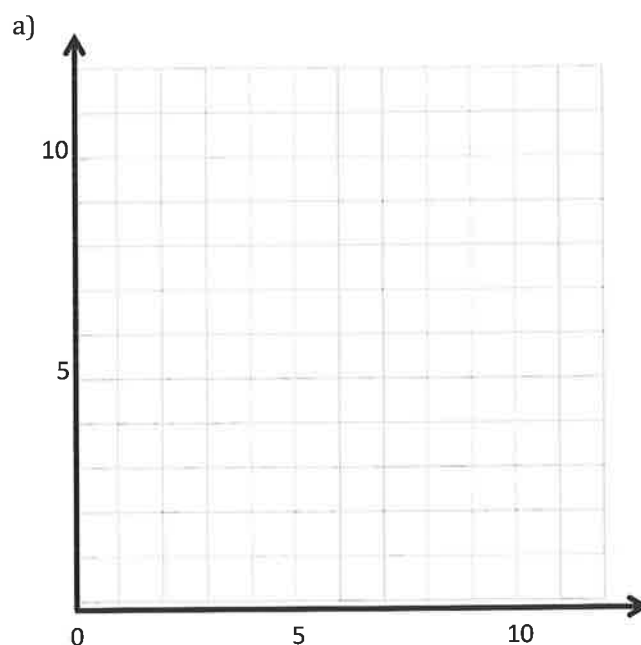
6. Write the coordinate pairs of 3 points that lie on the y -axis.

a. _____ b. _____ c. _____

7. Leslie and Peggy are playing *Battleship* on axes labeled in halves. Presented in the table is a record of Peggy's guesses so far. What should she guess next? How do you know? Explain using words and pictures.

$(5, 5)$	miss
$(4, 5)$	hit
$(3\frac{1}{2}, 5)$	miss
$(4\frac{1}{2}, 5)$	miss

Point	x	y	(x, y)
<i>H</i>			
<i>I</i>			
<i>J</i>			
<i>K</i>			
<i>L</i>			



Point	x	y	(x, y)
<i>D</i>	$2\frac{1}{2}$	0	$(2\frac{1}{2}, 0)$
<i>E</i>	$2\frac{1}{2}$	2	$(2\frac{1}{2}, 2)$
<i>F</i>	$2\frac{1}{2}$	4	$(2\frac{1}{2}, 4)$

Name _____

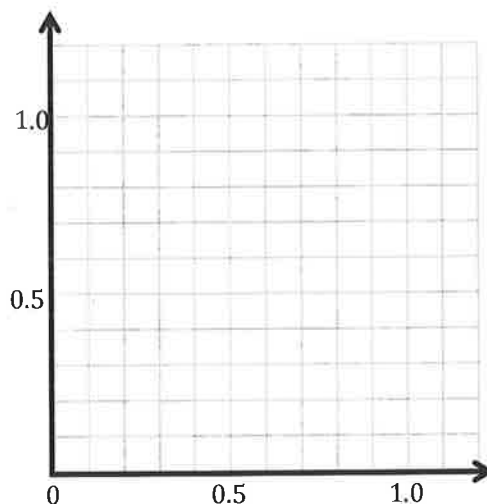
Date _____

1. Plot the following points, and label them on the coordinate plane.

$A: (0.3, 0.1)$ $B: (0.3, 0.7)$

$C: (0.2, 0.9)$ $D: (0.4, 0.9)$

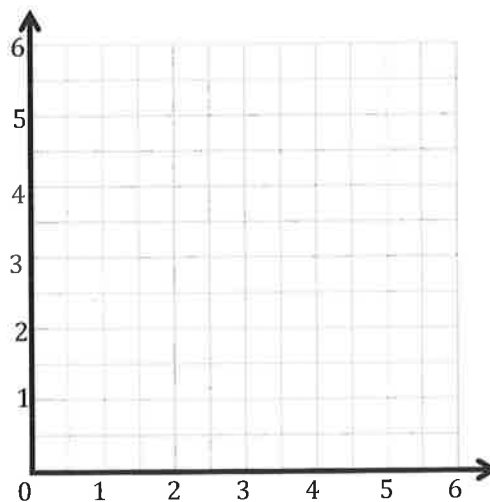
- Use a straightedge to construct line segments \overline{AB} and \overline{CD} .
- Line segment _____ is parallel to the x -axis and is perpendicular to the y -axis.
- Line segment _____ is parallel to the y -axis and is perpendicular to the x -axis.
- Plot a point on line segment \overline{AB} that is not at the endpoints, and name it U .
Write the coordinates. U (_____ , _____)



- Plot a point on line segment \overline{CD} and name it V . Write the coordinates. V (_____ , _____)

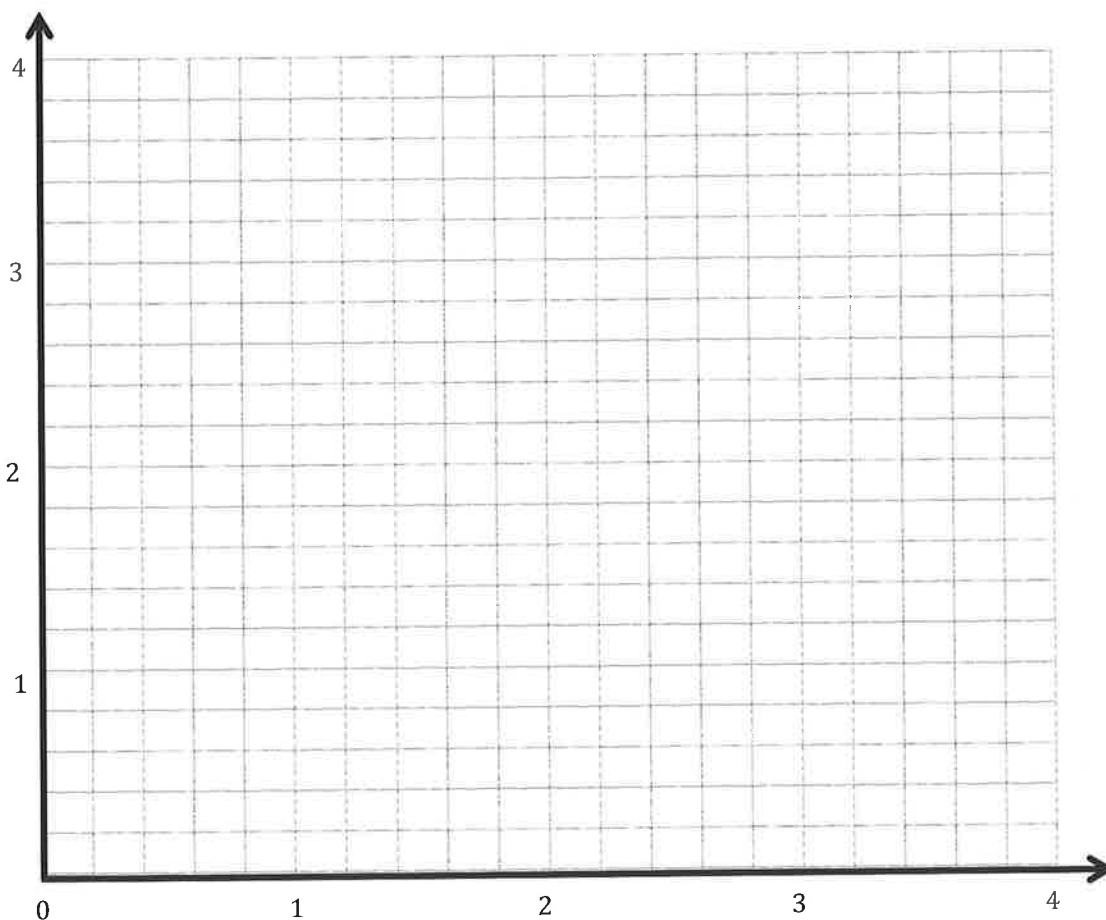
2. Construct line f such that the y -coordinate of every point is $3\frac{1}{2}$, and construct line g such that the x -coordinate of every point is $4\frac{1}{2}$.

- Line f is _____ units from the x -axis.
- Give the coordinates of the point on line f that is $\frac{1}{2}$ unit from the y -axis. _____
- With a blue pencil, shade the portion of the grid that is less than $3\frac{1}{2}$ units from the x -axis.
- Line g is _____ units from the y -axis.
- Give the coordinates of the point on line g that is 5 units from the x -axis. _____
- With a red pencil, shade the portion of the grid that is more than $4\frac{1}{2}$ units from the y -axis.



3. Complete the following tasks on the plane below.

- Construct a line ***m*** that is perpendicular to the x -axis and 3.2 units from the y -axis.
- Construct a line ***a*** that is 0.8 units from the x -axis.
- Construct a line ***t*** that is parallel to line ***m*** and is halfway between line ***m*** and the y -axis.
- Construct a line ***h*** that is perpendicular to line ***t*** and passes through the point $(1.2, 2.4)$.
- Using a blue pencil, shade the region that contains points that are more than 1.6 units and less than 3.2 units from the y -axis.
- Using a red pencil, shade the region that contains points that are more than 0.8 units and less than 2.4 units from the x -axis.
- Give the coordinates of a point that lies in the double-shaded region.



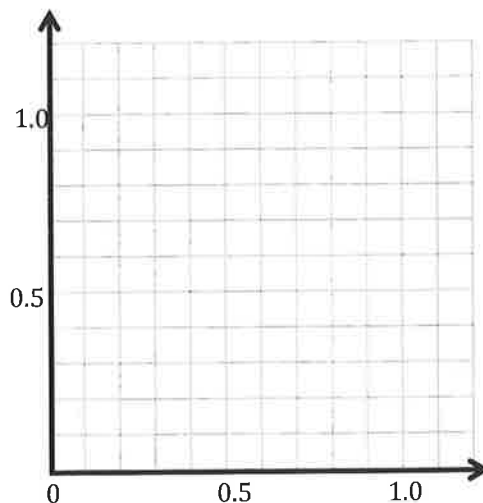
Name _____

Date _____

1. Plot and label the following points on the coordinate plane.

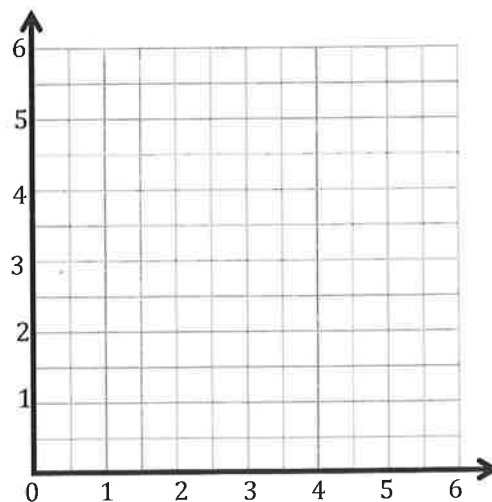
 $C: (0.4, 0.4)$ $A: (1.1, 0.4)$ $S: (0.9, 0.5)$ $T: (0.9, 1.1)$

- Use a straightedge to construct line segments \overline{CA} and \overline{ST} .
- Name the line segment that is perpendicular to the x -axis and parallel to the y -axis.
- Name the line segment that is parallel to the x -axis and perpendicular to the y -axis.
- Plot a point on \overline{CA} and name it E . Plot a point on line segment \overline{ST} and name it R .
- Write the coordinates of points E and R .

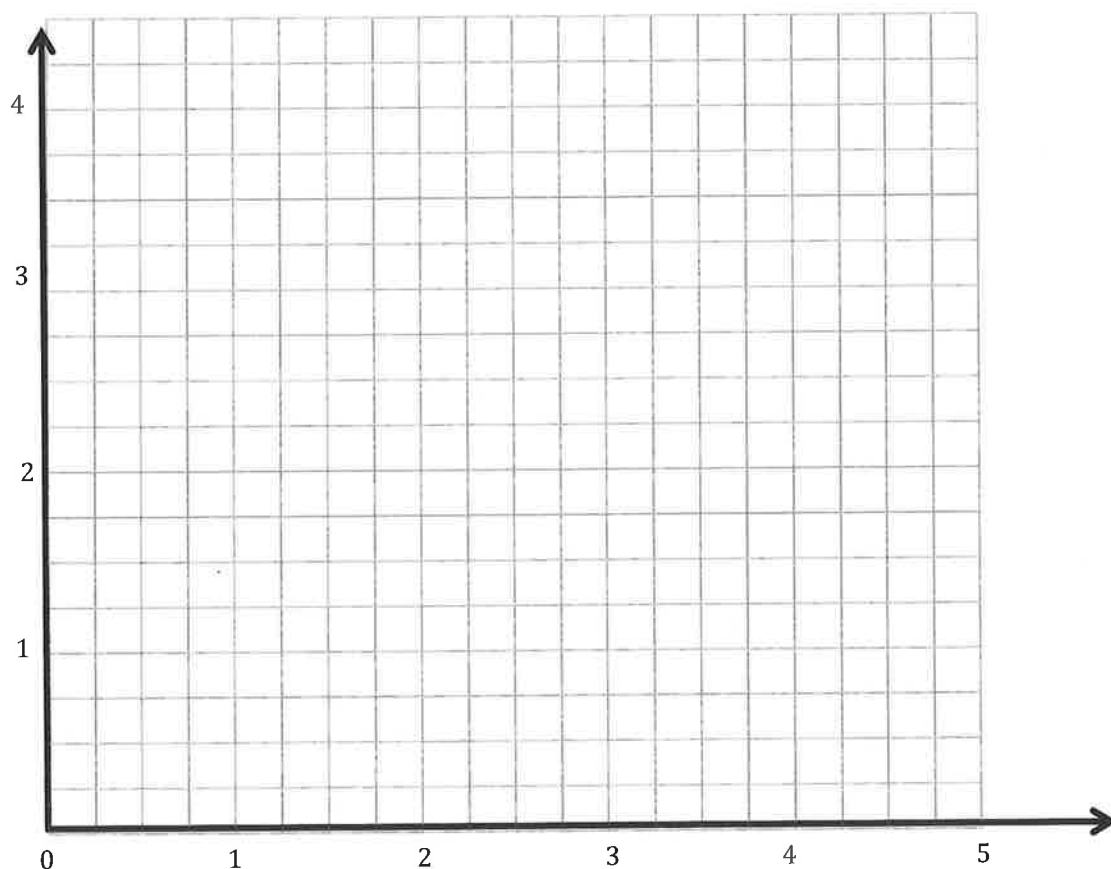
 $E (\quad , \quad)$ $R (\quad , \quad)$ 

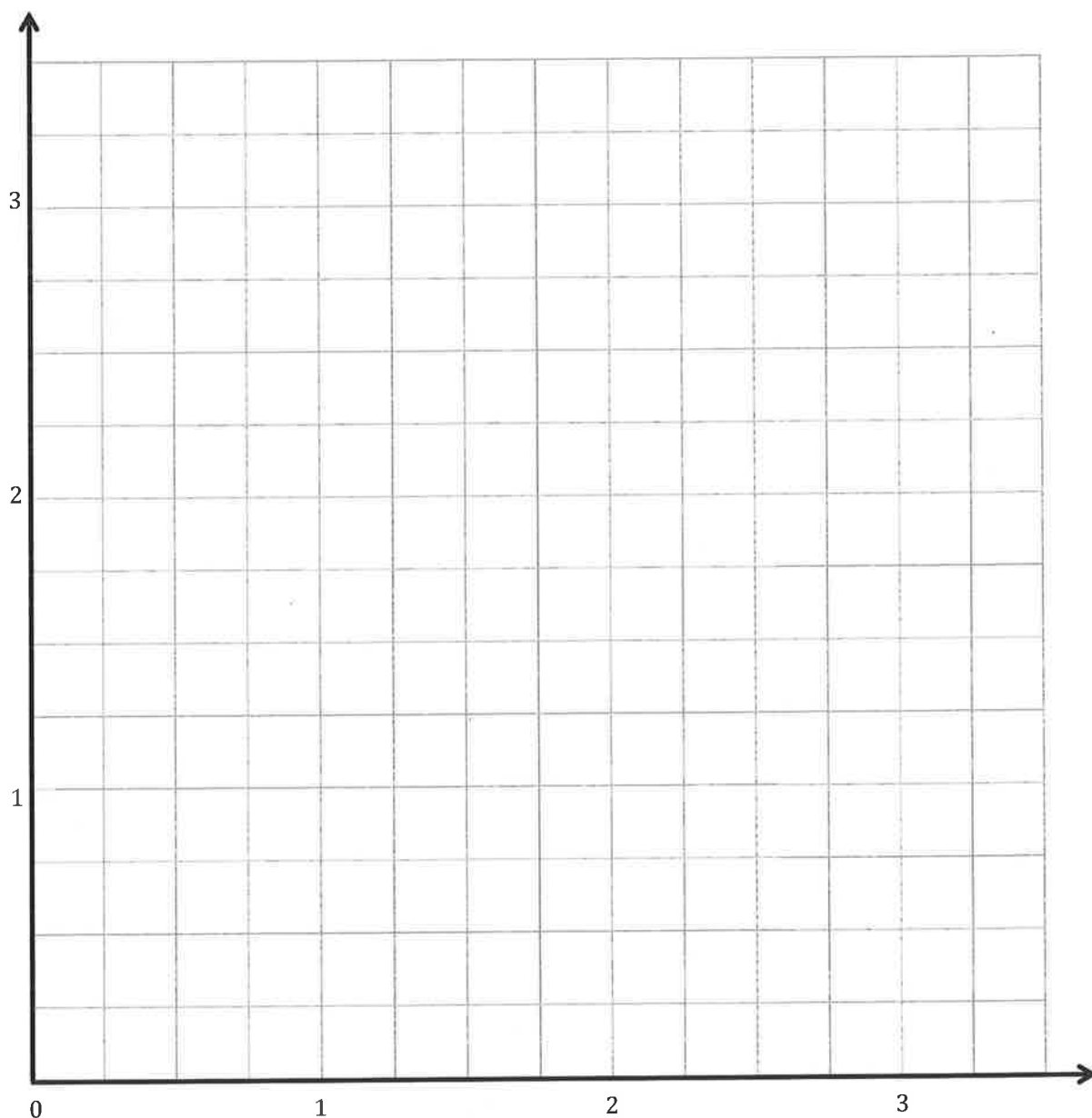
2. Construct line
- m
- such that the
- y
- coordinate of every point is
- $1\frac{1}{2}$
- , and construct line
- n
- such that the
- x
- coordinate of every point is
- $5\frac{1}{2}$
- .

- Line m is _____ units from the x -axis.
- Give the coordinates of the point on line m that is 2 units from the y -axis. _____
- With a blue pencil, shade the portion of the grid that is less than $1\frac{1}{2}$ units from the x -axis.
- Line n is _____ units from the y -axis.
- Give the coordinates of the point on line n that is $3\frac{1}{2}$ units from the x -axis. _____
- With a red pencil, shade the portion of the grid that is less than $5\frac{1}{2}$ units from the y -axis.



3. Construct and label lines e , r , s , o on the plane below.
- Line e is 3.75 units above the x -axis.
 - Line r is 2.5 units from the y -axis.
 - Line s is parallel to line e but 0.75 farther from the x -axis.
 - Line o is perpendicular to lines s and e and passes through the point $(3\frac{1}{4}, 3\frac{1}{4})$.
4. Complete the following tasks on the plane.
- Using a blue pencil, shade the region that contains points that are more than $2\frac{1}{2}$ units and less than $3\frac{1}{4}$ units from the y -axis.
 - Using a red pencil, shade the region that contains points that are more than $3\frac{3}{4}$ units and less than $4\frac{1}{2}$ units from the x -axis.
 - Plot a point that lies in the double shaded region, and label its coordinates.





Point	x	y	(x, y)
A			
B			
C			

Point	x	y	(x, y)
D			
E			
F			



Lesson 6:

Date:

Investigate patterns in vertical and horizontal lines, and interpret points on the plane as distances from the axes.

1/31/14

engage^{ny}

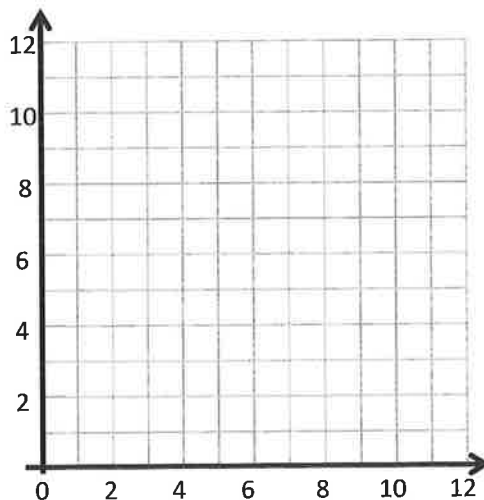
6.A.77

Name _____

Date _____

1. Complete the chart. Then, plot the points on the coordinate plane below.

x	y	(x, y)
0	1	$(0, 1)$
2	3	
4	5	
6	7	

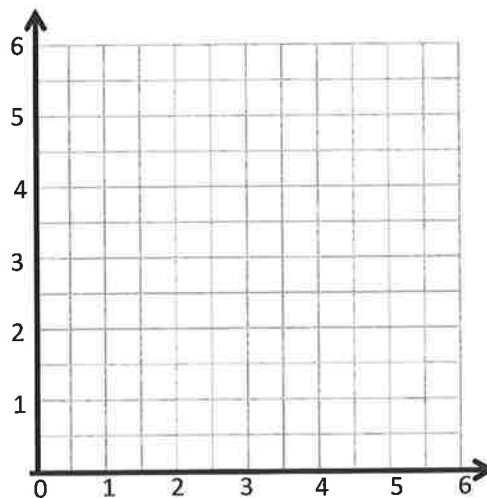


- Use a straightedge to draw a line connecting these points.
- Write a rule showing the relationship between the x - and y -coordinates of points on the line.

- Name 2 other points that are on this line.

2. Complete the chart. Then, plot the points on the coordinate plane below.

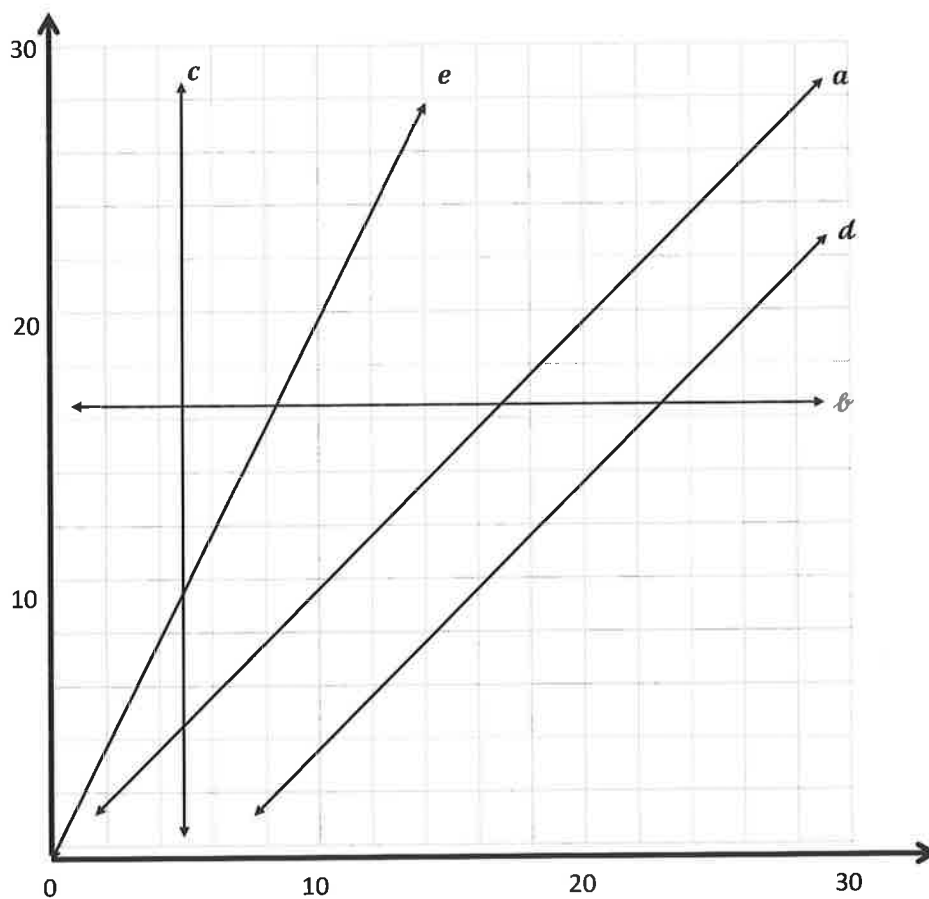
x	y	(x, y)
$\frac{1}{2}$	1	
1	2	
$1\frac{1}{2}$	3	
2	4	



- Use a straightedge to draw a line connecting these points.

b. Write a rule showing the relationship between the x - and y -coordinates.

c. Name 2 other points that are on this line. _____



3. Use the coordinate plane below to answer the following questions.

a. Give the coordinates for 3 points that are on line **a**. _____

b. Write a rule that describes the relationship between the x - and y -coordinates for the points on line **a**.

c. What do you notice about the y -coordinates of every point on line b ?

d. Fill in the missing coordinates for points on line d .

(12, _____) (6, _____) (_____, 24) (36, _____) (_____, 30)

e. For any point on line c , the x -coordinate is _____.

f. Each of the points lies on at least 1 of the lines shown in the plane above. Identify a line that contains each of the following points.

a. (7, 7) a

b. (14, 8) _____

c. (5, 10) _____

d. (0, 17) _____

e. (15.3, 9.3) _____

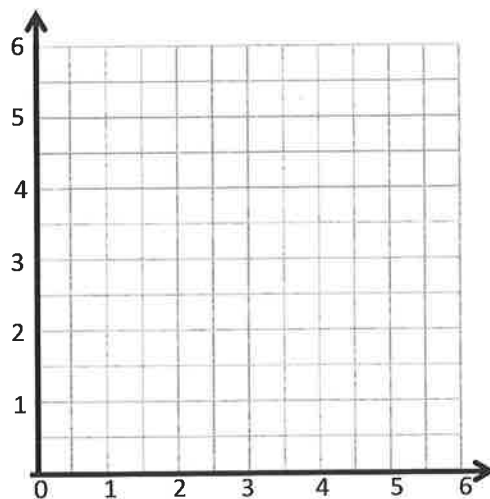
f. (20, 40) _____

Name _____

Date _____

1. Complete the chart. Then, plot the points on the coordinate plane.

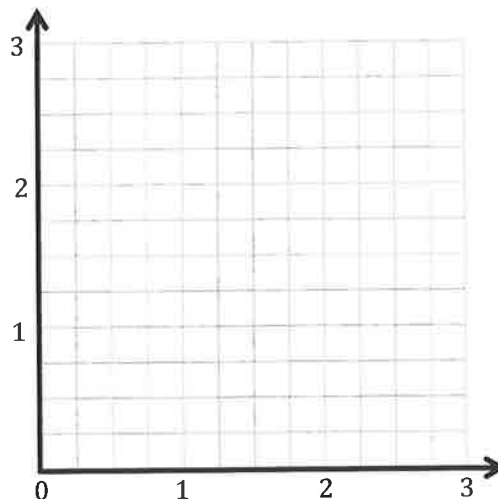
x	y	(x, y)
2	0	
$3\frac{1}{2}$	$1\frac{1}{2}$	
$4\frac{1}{2}$	$2\frac{1}{2}$	
6	4	



- Use a straightedge to draw a line connecting these points.
- Write a rule showing the relationship between the x - and y - coordinates of points on this line.
- Name two other points that are also on this line. _____

2. Complete the chart. Then, plot the points on the coordinate plane.

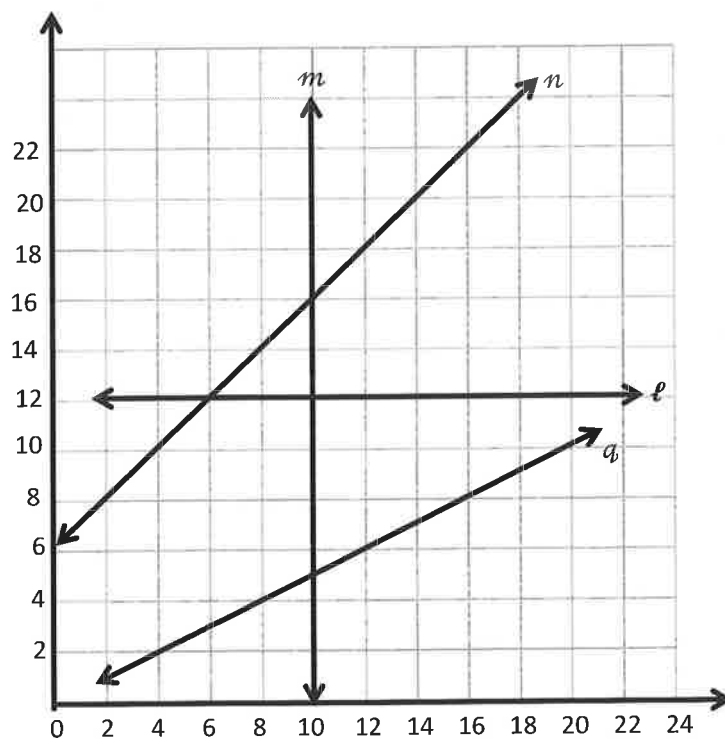
x	y	(x, y)
0	0	
$\frac{1}{4}$	$\frac{3}{4}$	
$\frac{1}{2}$	$1\frac{1}{2}$	
1	3	



- Use a straightedge to draw a line connecting these points.
- Write a rule showing the relationship between the x - and y - coordinates for points on the line.
- Name two other points that are also on this line. _____

3. Use the coordinate plane to answer the following questions.

- For any point on line m , the x -coordinate is _____.
- Give the coordinates for 3 points that are on line n .
- Write a rule that describes the relationship between the x - and y -coordinates on line n .
- Give the coordinates for 3 points that are on line q .



- Write a rule that describes the relationship between the x - and y -coordinates on line q .
- For each point, identify a line on which each of these points lie.

(10,3.2) _____ (12.4, 18.4) _____ (6.45, 12) _____ (14, 7) _____

Name _____

Date _____

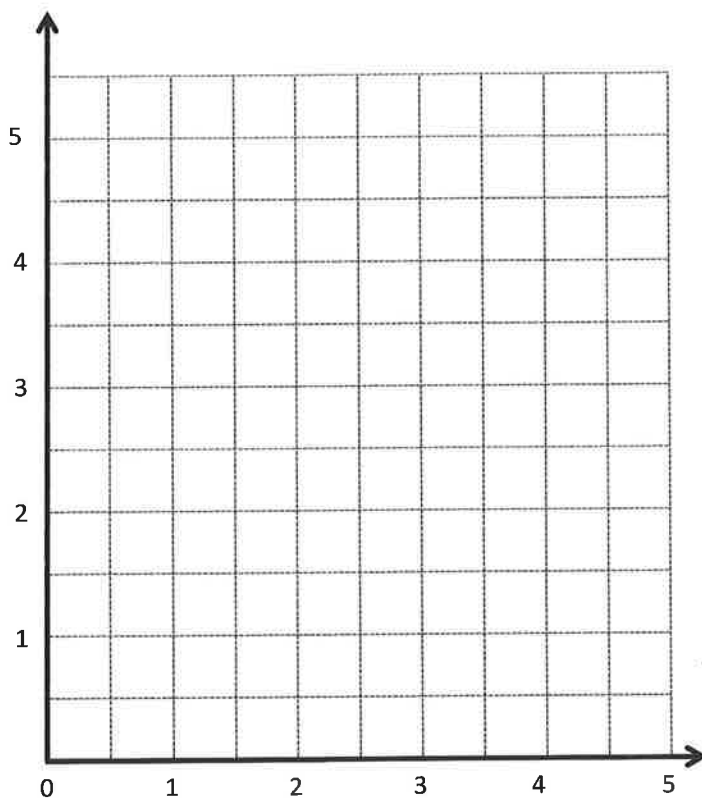
1.

a.

Point	x	y	(x, y)
A	0	0	$(0, 0)$
B	1	1	$(1, 1)$
C	2	2	$(2, 2)$
D	3	3	$(3, 3)$

b.

Point	x	y	(x, y)
G	0	3	$(0, 3)$
H	$\frac{1}{2}$	$3\frac{1}{2}$	$(\frac{1}{2}, 3\frac{1}{2})$
I	1	4	$(1, 4)$
J	$1\frac{1}{2}$	$4\frac{1}{2}$	$(1\frac{1}{2}, 4\frac{1}{2})$



2.

a.

Point	(x, y)
L	$(0, 3)$
M	$(2, 3)$
N	$(4, 3)$

b.

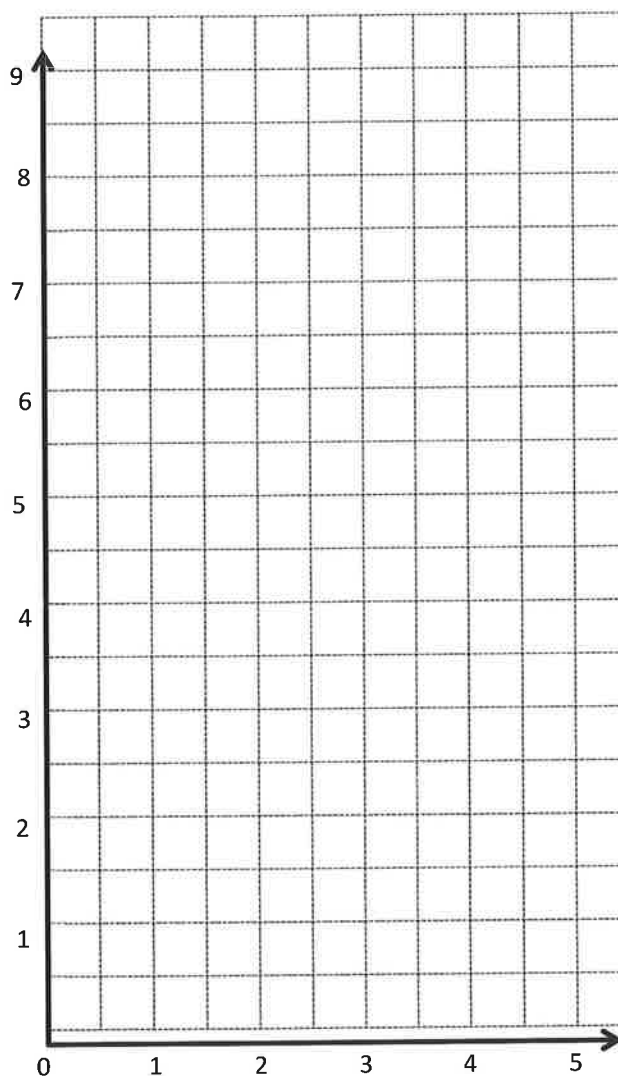
Point	(x, y)
O	$(0, 0)$
P	$(1, 2)$
Q	$(2, 4)$

c.

Point	(x, y)
R	$(1, \frac{1}{2})$
S	$(2, 1\frac{1}{2})$
T	$(2, 2\frac{1}{2})$

d.

Point	(x, y)
U	$(1, 3)$
V	$(2, 6)$
W	$(3, 9)$



A

Correct _____

Multiply.

1	$62.3 \times 10 =$		23	$4.1 \times 1000 =$	
2	$62.3 \times 100 =$		24	$7.6 \times 1000 =$	
3	$62.3 \times 1000 =$		25	$0.01 \times 1000 =$	
4	$73.6 \times 10 =$		26	$0.07 \times 1000 =$	
5	$73.6 \times 100 =$		27	$0.072 \times 100 =$	
6	$73.6 \times 1000 =$		28	$0.802 \times 10 =$	
7	$0.6 \times 10 =$		29	$0.019 \times 1000 =$	
8	$0.06 \times 10 =$		30	$7.412 \times 1000 =$	
9	$0.006 \times 10 =$		31	$6.8 \times 100 =$	
10	$0.3 \times 10 =$		32	$4.901 \times 10 =$	
11	$0.3 \times 100 =$		33	$16.07 \times 100 =$	
12	$0.3 \times 1000 =$		34	$9.19 \times 10 =$	
13	$0.02 \times 10 =$		35	$18.2 \times 100 =$	
14	$0.02 \times 100 =$		36	$14.7 \times 1000 =$	
15	$0.02 \times 1000 =$		37	$2.021 \times 100 =$	
16	$0.008 \times 10 =$		38	$172.1 \times 10 =$	
17	$0.008 \times 100 =$		39	$3.2 \times 20 =$	
18	$0.008 \times 1000 =$		40	$4.1 \times 20 =$	
19	$0.32 \times 10 =$		41	$3.2 \times 30 =$	
20	$0.67 \times 10 =$		42	$1.3 \times 30 =$	
21	$0.91 \times 100 =$		43	$3.12 \times 40 =$	
22	$0.74 \times 100 =$		44	$14.12 \times 40 =$	

B Improvement _____ # Correct _____

Multiply.

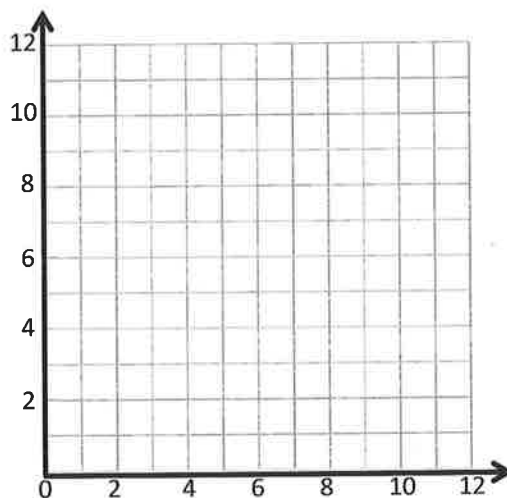
1	$46.1 \times 10 =$		23	$5.2 \times 1000 =$	
2	$46.1 \times 100 =$		24	$8.7 \times 1000 =$	
3	$46.1 \times 1000 =$		25	$0.01 \times 1000 =$	
4	$89.2 \times 10 =$		26	$0.08 \times 1000 =$	
5	$89.2 \times 100 =$		27	$0.083 \times 10 =$	
6	$89.2 \times 1000 =$		28	$0.903 \times 10 =$	
7	$0.3 \times 10 =$		29	$0.017 \times 1000 =$	
8	$0.03 \times 10 =$		30	$8.523 \times 1000 =$	
9	$0.003 \times 10 =$		31	$7.9 \times 100 =$	
10	$0.9 \times 10 =$		32	$5.802 \times 10 =$	
11	$0.9 \times 100 =$		33	$27.08 \times 100 =$	
12	$0.9 \times 1000 =$		34	$8.18 \times 10 =$	
13	$0.04 \times 10 =$		35	$29.3 \times 100 =$	
14	$0.04 \times 100 =$		36	$25.8 \times 1000 =$	
15	$0.04 \times 1000 =$		37	$3.032 \times 100 =$	
16	$0.007 \times 10 =$		38	$283.1 \times 10 =$	
17	$0.007 \times 100 =$		39	$2.1 \times 20 =$	
18	$0.007 \times 1000 =$		40	$3.3 \times 20 =$	
19	$0.45 \times 10 =$		41	$3.1 \times 30 =$	
20	$0.78 \times 10 =$		42	$1.2 \times 30 =$	
21	$0.28 \times 100 =$		43	$2.11 \times 40 =$	
22	$0.19 \times 100 =$		44	$13.11 \times 40 =$	

Name _____

Date _____

1. Create a table of 3 values for x and y such that each y -coordinate is 3 more than the corresponding x -coordinate.

x	y	(x, y)



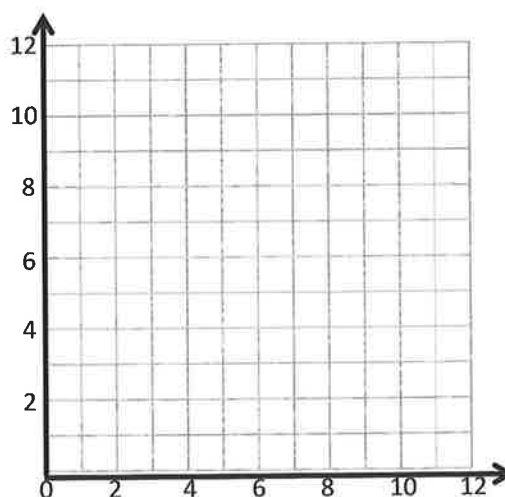
- a. Plot each point on the coordinate plane.
- b. Use a straightedge to draw a line connecting these points.

- c. Give the coordinates of 2 other points that fall on this line with x -coordinates greater than 12.

(____, ____) and (____, ____).

2. Create a table of 3 values for x and y such that each y -coordinate is 3 times as much as its corresponding x -coordinate.

x	y	(x, y)



- a. Plot each point on the coordinate plane.

- b. Use a straightedge to draw a line connecting these points.
- c. Give the coordinates of 2 other points that fall on this line with y -coordinates greater than 25.

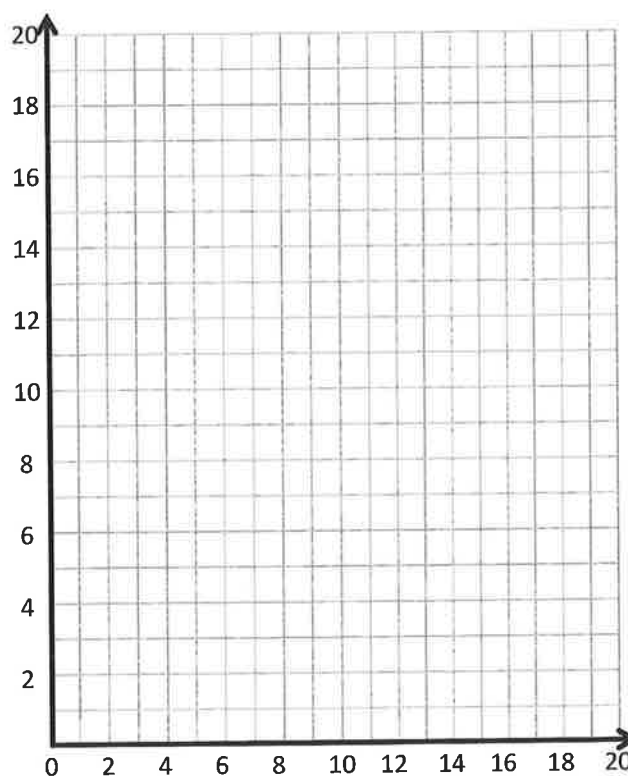
(____, ____) and (____, ____).

3. Create a table of 5 values for x and y such that each y -coordinate is 1 more than 3 times as much as its corresponding x value.

x	y	(x, y)

- a. Plot each point on the coordinate plane.
- b. Use a straightedge to draw a line connecting these points.
- c. Give the coordinates of 2 other points that would fall on this line whose x -coordinates are greater than 12.

(____, ____) and (____, ____).



4. Use the coordinate plane below to complete the following tasks.

a. Graph the lines on the plane.

line ℓ : x is equal to y

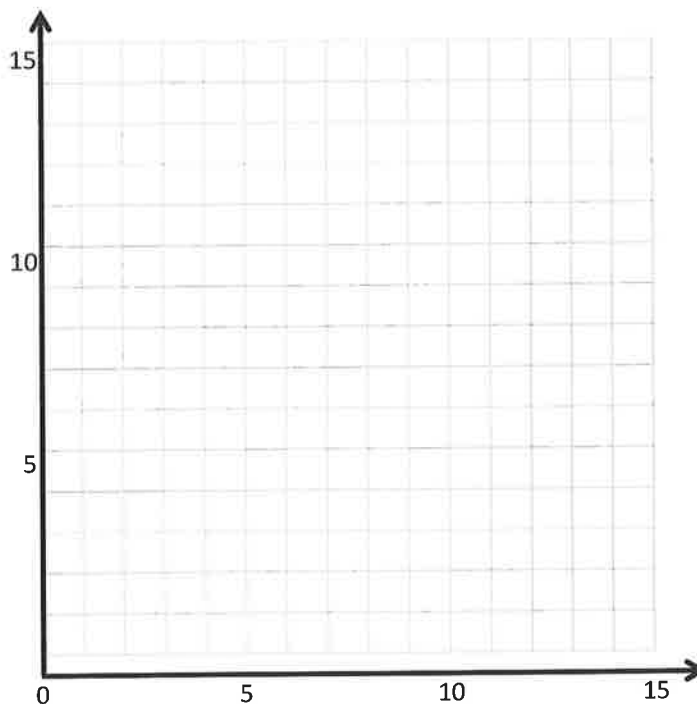
	x	y	(x, y)
A			
B			
C			

line m : y is 1 more than x

	x	y	(x, y)
G			
H			
I			

line n : y is 1 more than twice x

	x	y	(x, y)
S			
T			
U			



b. Which two lines intersect? Give the coordinates of their intersection.

c. Which two lines are parallel?

d. Give the rule for another line that would be parallel to the lines you listed in (c).

Name _____

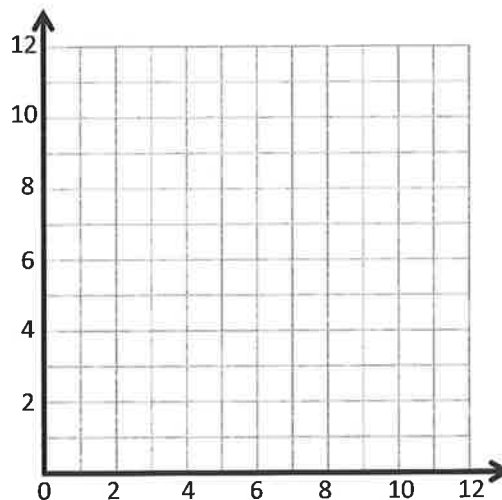
Date _____

1. Complete this table such that each y -coordinate is 4 more than the corresponding x -coordinate.

x	y	(x, y)

- Plot each point on the coordinate plane.
- Use a straightedge to construct a line connecting these points.
- Give the coordinates of 2 other points that fall on this line with x -coordinates greater than 18.

(_____, _____) and (_____, _____).

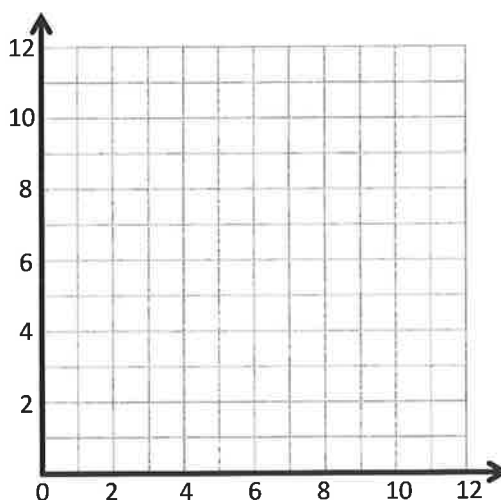


2. Complete this table such that each y -coordinate is 2 times as much as its corresponding x -coordinate.

x	y	(x, y)

- Plot each point on the coordinate plane.
- Use a straightedge to draw a line connecting these points.
- Give the coordinates of 2 other points that fall on this line with y -coordinates greater than 25.

(_____, _____) and (_____, _____).



3. Use the coordinate plane below to complete the following tasks.

- a. Graph these lines on the plane.

line ℓ : x is equal to y

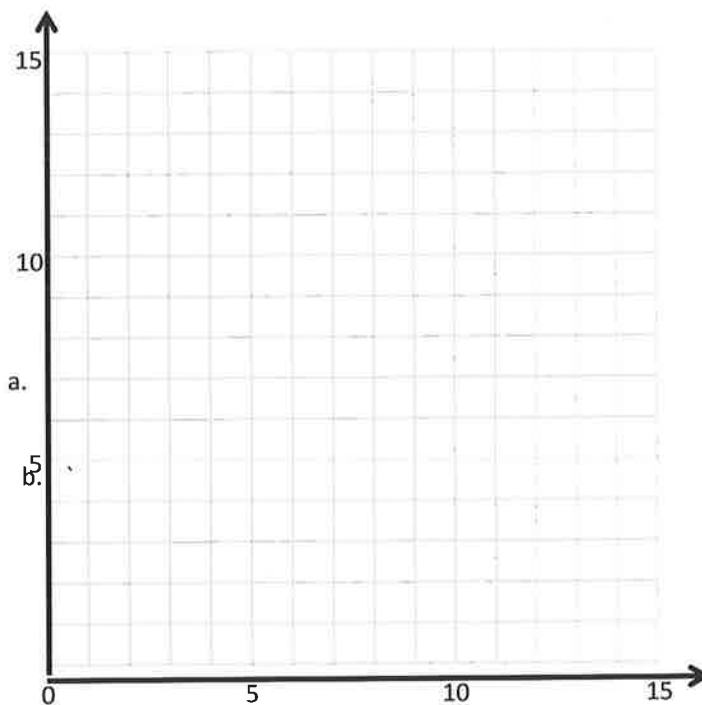
	x	y	(x, y)
A			
B			
C			

line m : y is 1 less than x

	x	y	(x, y)
G			
H			
I			

line n : y is 1 less than twice x

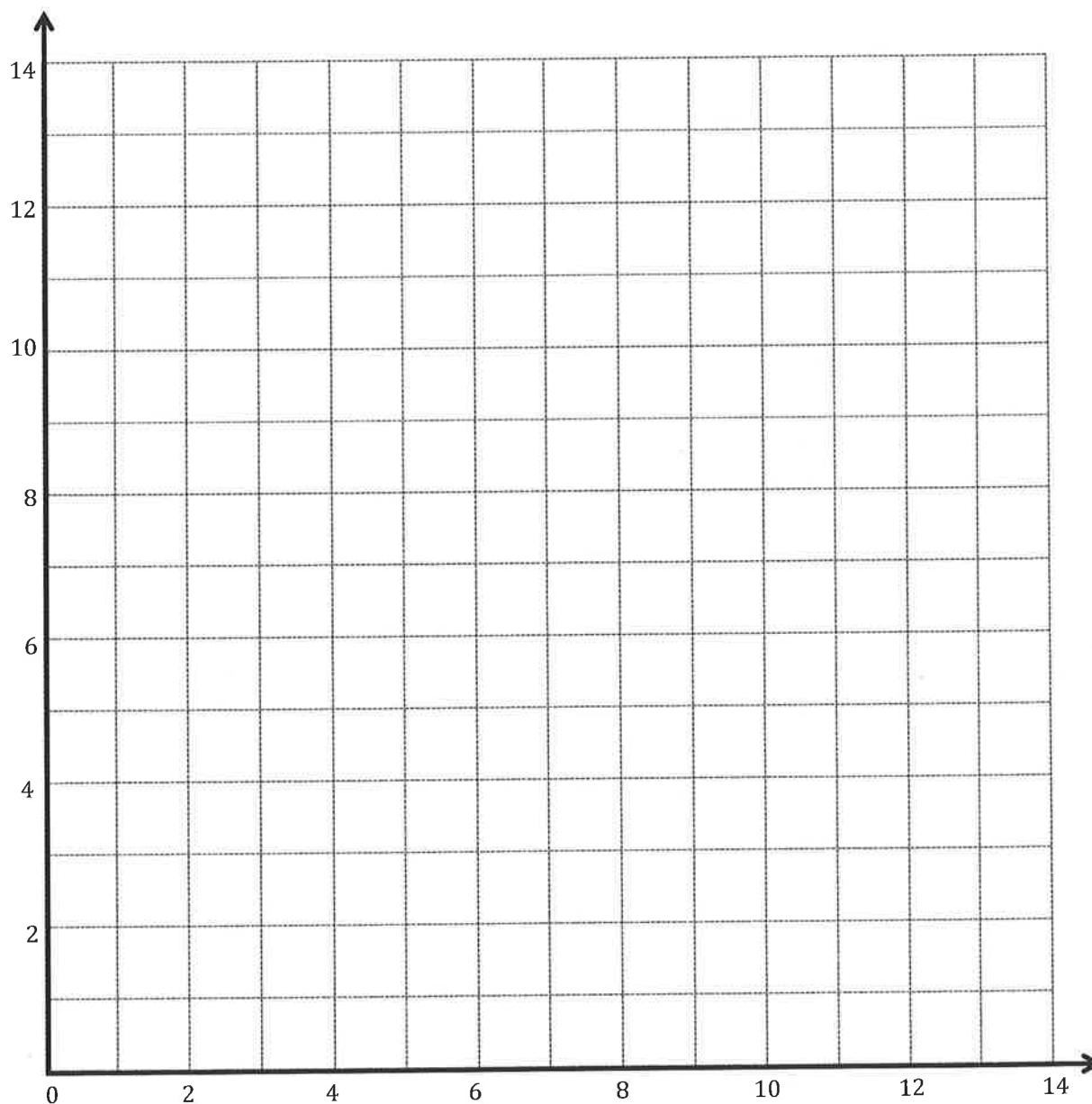
	x	y	(x, y)
S			
T			
U			



- b. Do any of these lines intersect? If yes, identify which ones, and give the coordinates of their intersection.

- c. Are any of these lines parallel? If yes, identify which ones.

- d. Give the rule for another line that would be parallel to the lines you listed in (c).



Line <i>a</i> :		
<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)

Line <i>b</i> :		
<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)

Line <i>c</i> :		
<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)

Name _____

Date _____

1. Complete the table for the given rules.

Line *a*

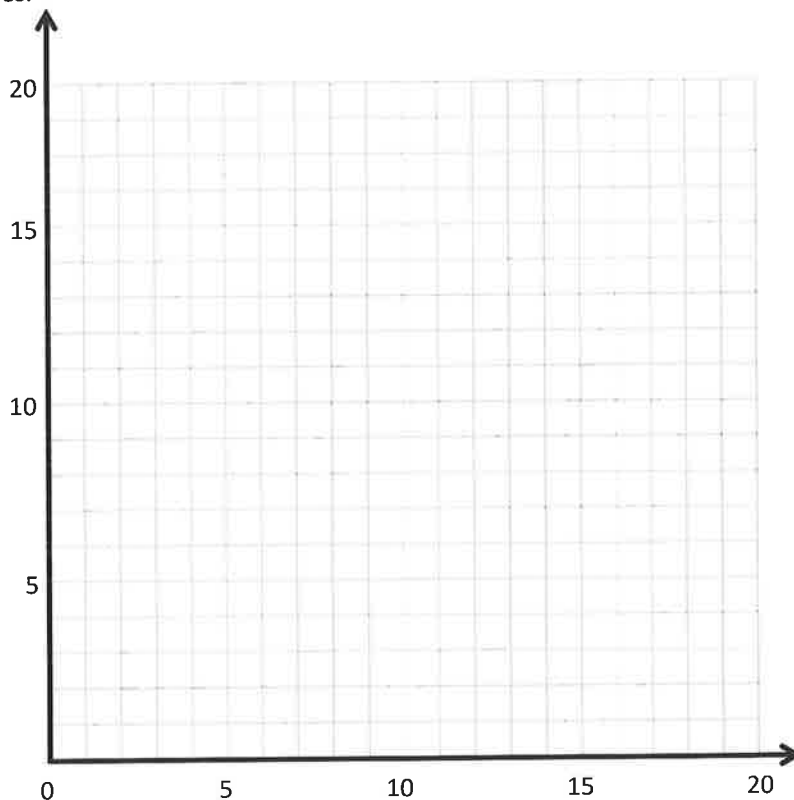
Rule: *y* is 1 more than *x*

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)
1		
5		
9		
13		

Line *b*

Rule: *y* is 4 more than *x*

<i>z</i>	<i>y</i>	(<i>x</i> , <i>y</i>)
0		
5		
8		
11		



- Construct each line on the coordinate plane above.
 - Compare and contrast these lines.
- c. Based on the patterns you see, predict what line *c*, whose rule is *7 more than x*, would look like.
Draw your prediction on the plane above.

2. Complete the table for the given rules for x values 0, 3, 7, and 9.

Line e

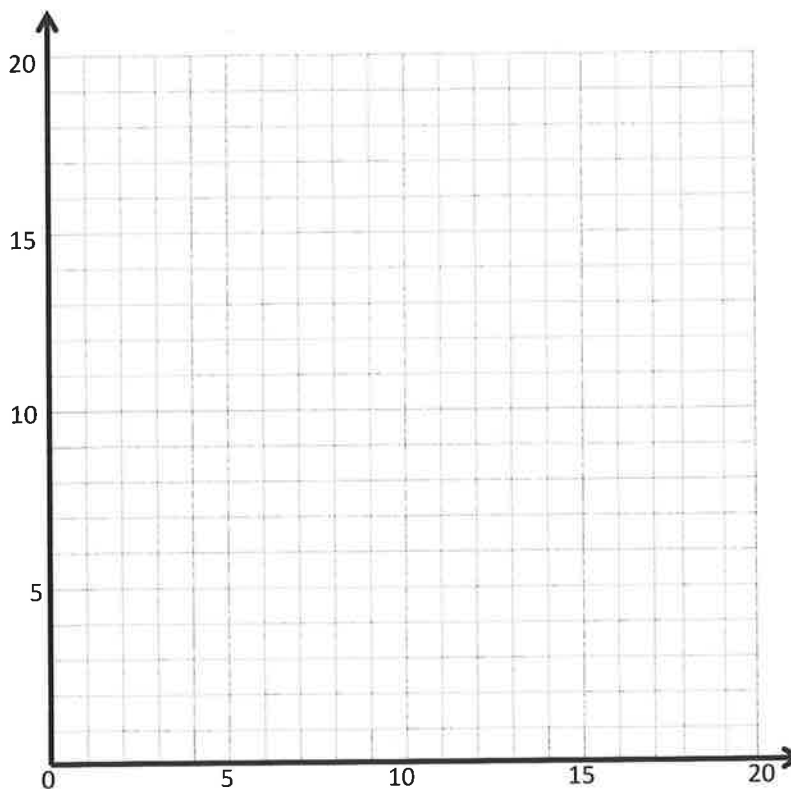
Rule: y is twice as much as x

x	y	(x, y)

Line f

Rule: y is half as much as x

x	y	(x, y)



- Construct each line on the coordinate plane above.
 - Compare and contrast these lines.
- c. Based on the patterns you see, predict what line g , whose rule is *4 times as much as x* , would look like. Draw your prediction in the plane above.

Name _____

Date _____

1. Complete the table for the given rules.

Line *a*

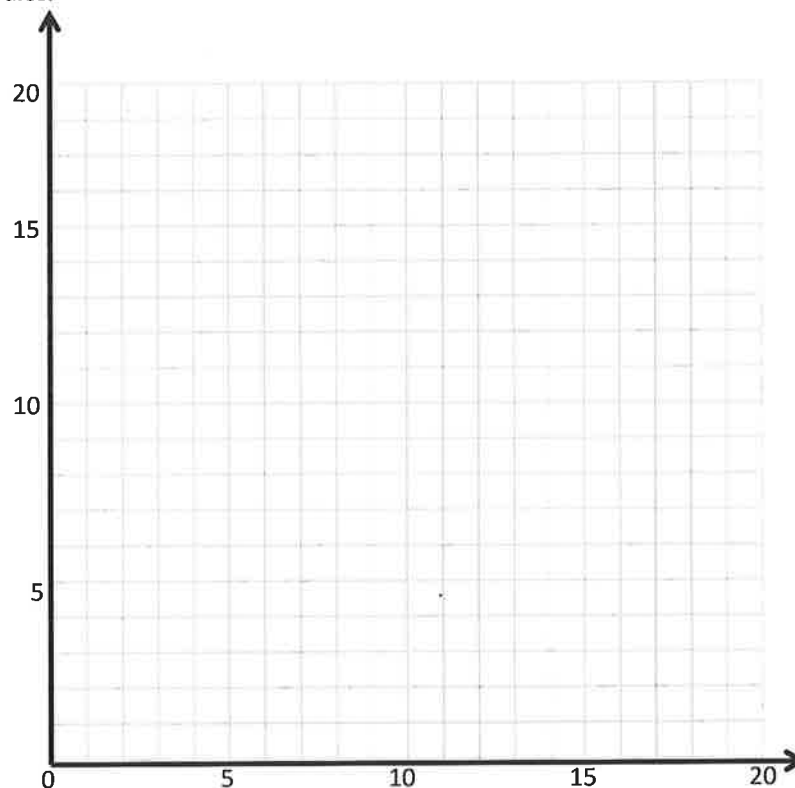
Rule: *y* is 1 less than *x*

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)
1		
4		
9		
16		

Line *b*

Rule: *y* is 5 less than *x*

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)
5		
8		
14		
20		



- Construct each line on the coordinate plane.
 - Compare and contrast these lines.
- c. Based on the patterns you see, predict what line *c*, whose rule is 7 less than *x*, would look like. Draw your prediction on the plane above.

Name _____

Date _____

Line ℓ

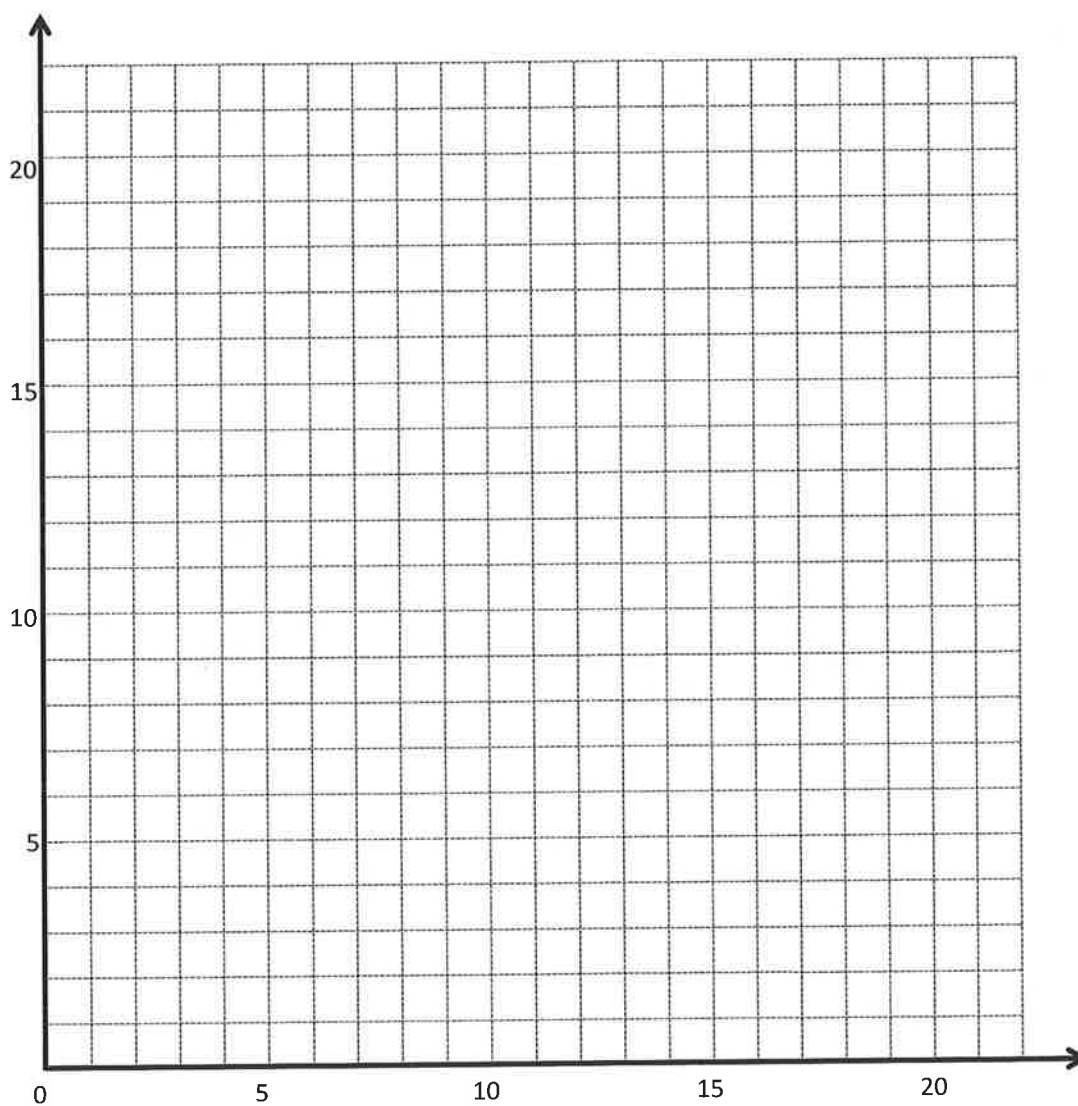
Line m

Rule: y is 2 more than x

Rule: y is 5 more than x

x	y	(x, y)
1		
5		
10		
15		

x	y	(x, y)
0		
5		
10		
15		



Lesson 9:

Generate two number patterns from given rules, plot the points, and analyze the patterns.

Date:

1/31/14

engage^{ny}

6.B.45

Line *p*

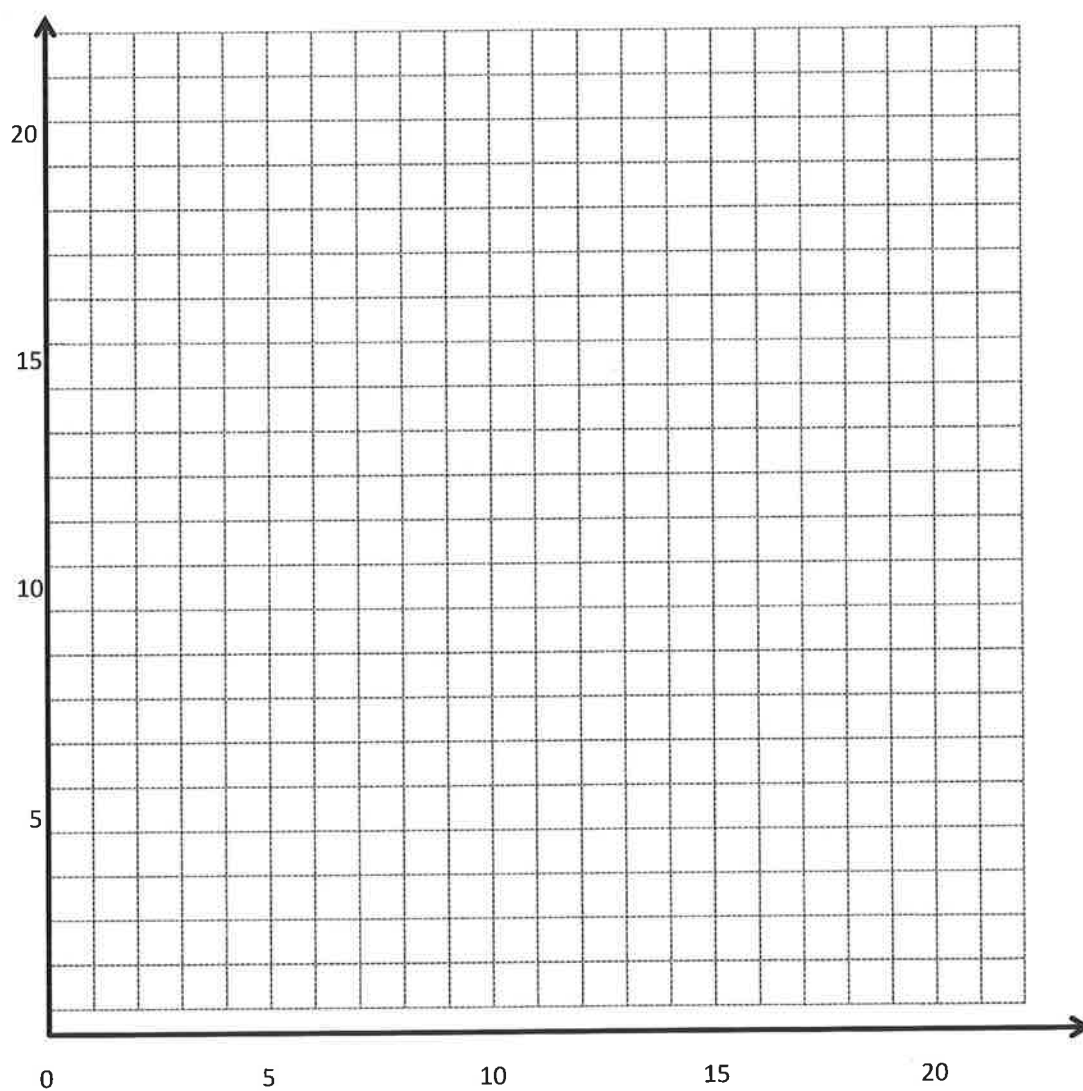
Rule: *y* is *x* times 2

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)

Line *q*

Rule: *y* is *x* times 3

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)

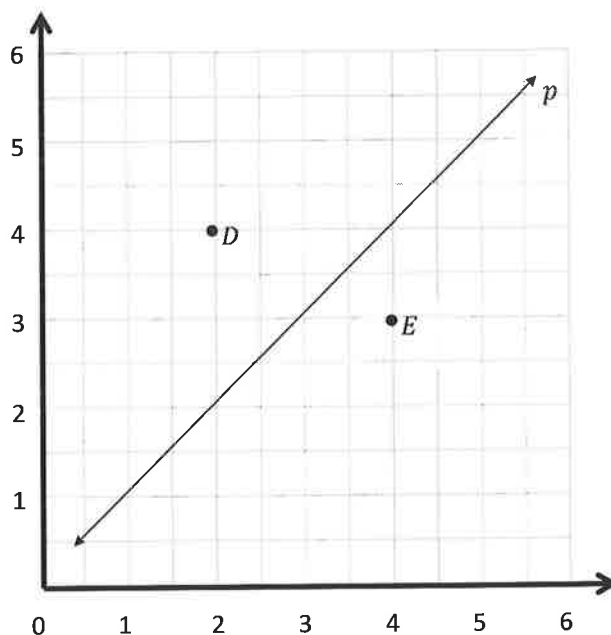


Name _____

Date _____

1. Use the coordinate plane below to complete the following tasks.

- Line p represents the rule, x and y are equal.
- Construct a line, d , that is parallel to line p and contains point D .
- Name 3 coordinates pairs on line d .



- Identify a rule to describe line d .

- Construct a line, e , that is parallel to line p and contains point E .

- Name 3 points on line e .

- Identify a rule to describe line e .

- Compare and contrast lines d and e in terms of their relationship to line p .

2. Write a rule for a fourth line that would be parallel to those above and would contain the point $(3\frac{1}{2}, 6)$.

- Explain how you know.

3. Use the coordinate plane below to complete the following tasks.

- Line p represents the rule x and y are equal.
- Construct a line, v , that contains the origin and point V .
- Name 3 points on line v .

d. Identify a rule to describe line v .

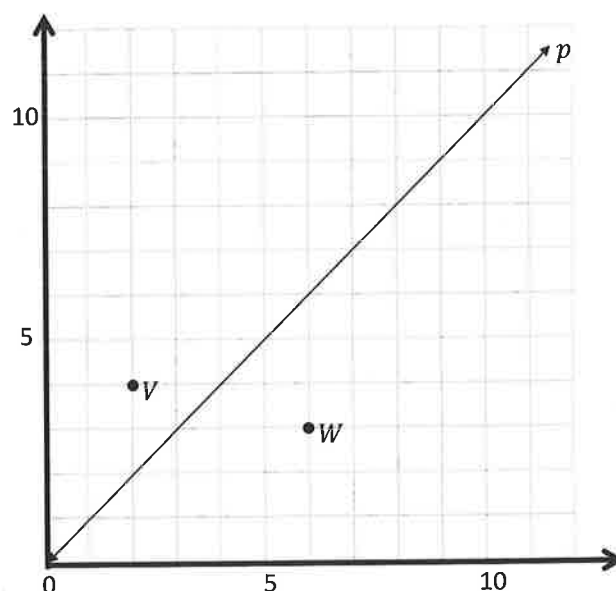
e. Construct a line, w , that contains the origin and point W .

f. Name 3 points on line w .

g. Identify a rule to describe line w .

h. Compare and contrast lines v and w in terms of their relationship to line p .

i. What patterns do you see in lines that are generated by multiplication rules?



4. Circle the rules that generate lines that are parallel to each other.

Add 5 to x

Multiply x by $\frac{2}{3}$

x plus $\frac{1}{2}$

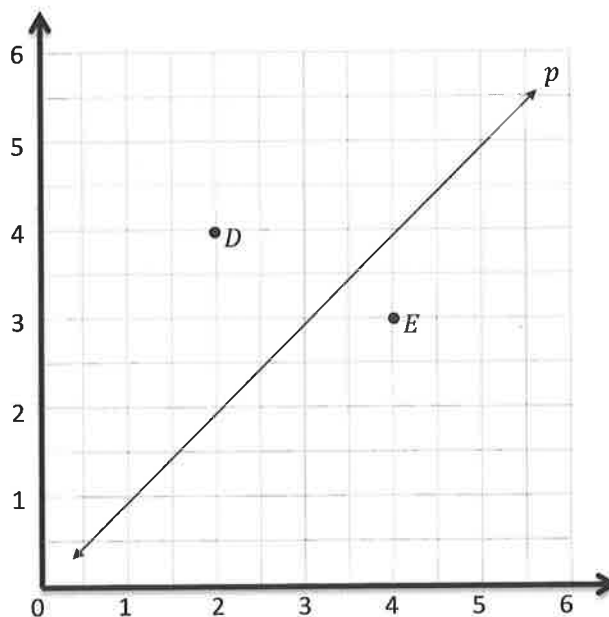
x times $1\frac{1}{2}$

Name _____

Date _____

1. Use the coordinate plane to complete the following tasks.

- Line p represents the rule x and y are equal.
- Construct a line, d , that is parallel to line p and contains point D .
- Name 3 coordinates pairs on line d .



- Identify a rule to describe line d .

- Construct a line, e , that is parallel to line p and contains point E .
- Name 3 points on line e .

- Identify a rule to describe line e .

- Compare and contrast lines d and e in terms of their relationship to line p .

2. Write a rule for a fourth line that would be parallel to those above and that would contain the point $(5\frac{1}{2}, 2)$. Explain how you know.

3. Use the coordinate plane below to complete the following tasks.

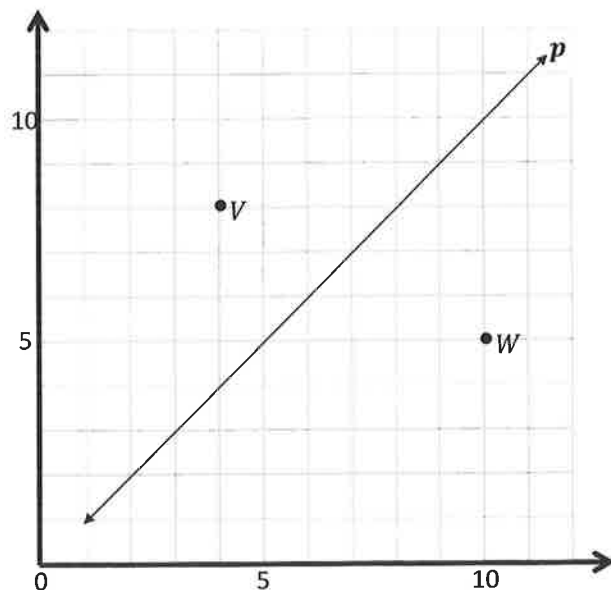
- Line p represents the rule x and y are equal.
- Construct a line, v , that contains the origin and point V .
- Name 3 points on line v .

- Identify a rule to describe line v .

- Construct a line, w , that contains the origin and point W .

- Name 3 points on line w .

- Identify a rule to describe line w .



- Compare and contrast lines v and w in terms of their relationship to line p .
- i. What patterns do you see in lines that are generated by multiplication rules?

Line *p*

Rule: y is 0 more than x

x	y	(x, y)
0		
5		
10		
15		

Line *b*

Rule: _____

x	y	(x, y)
7		
10		
13		
18		

Line *c*

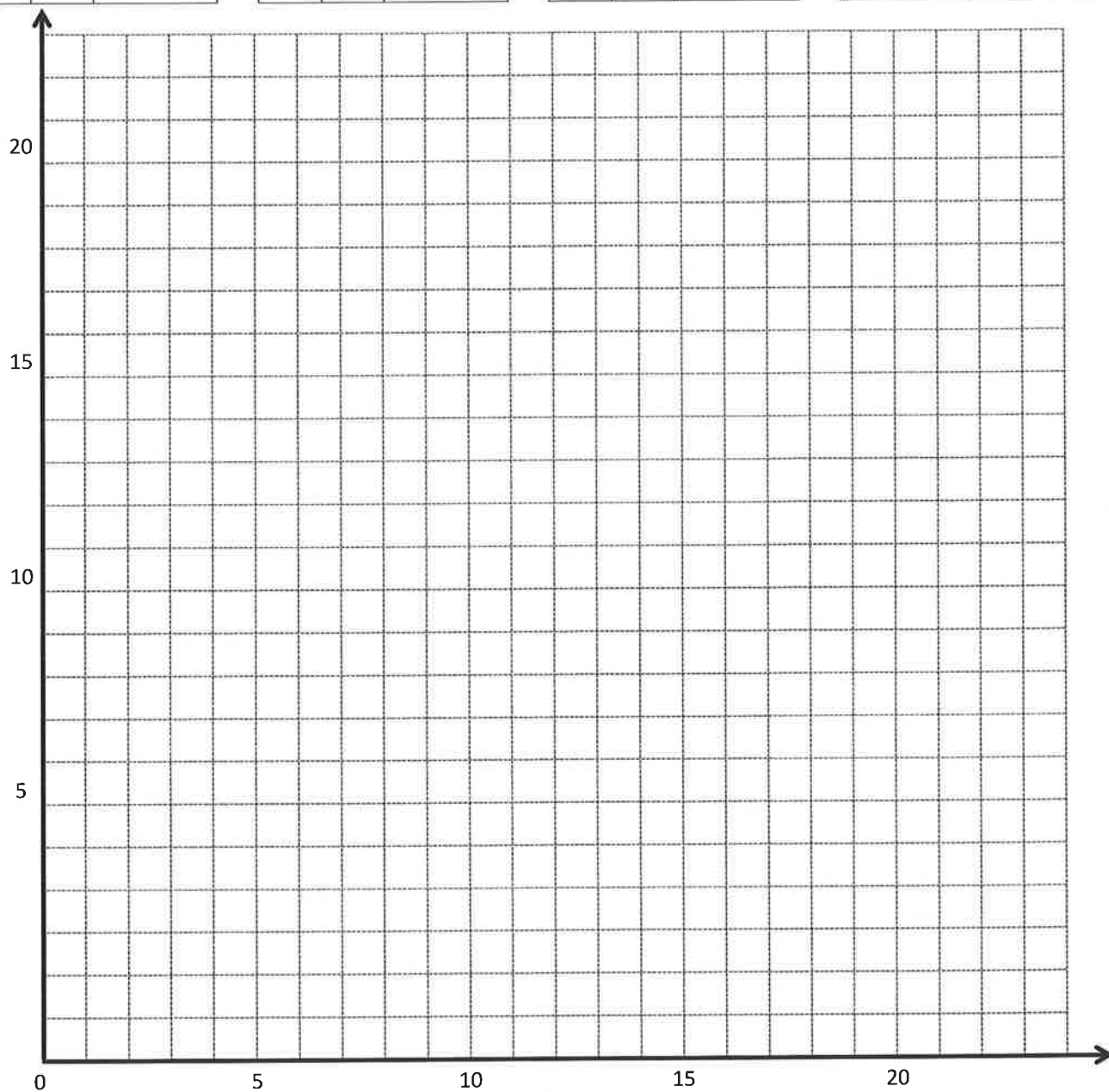
Rule: _____

x	y	(x, y)
2		
4		
8		
11		

Line *d*

Rule: _____

x	y	(x, y)
5		
7		
12		
15		



Line *g*

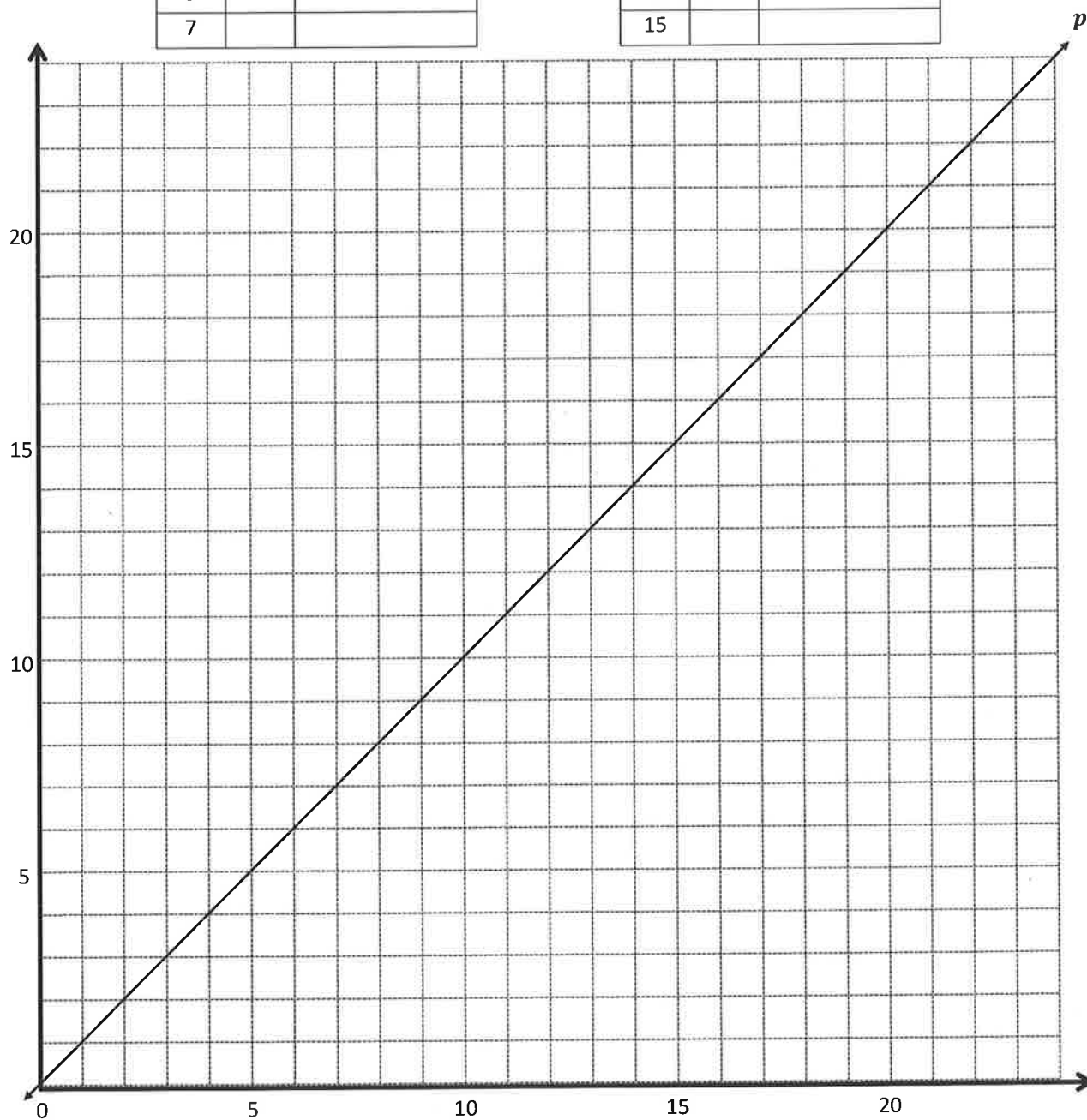
Rule: _____

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)
1		
2		
5		
7		

Line *h*

Rule: _____

<i>x</i>	<i>y</i>	(<i>x</i> , <i>y</i>)
3		
6		
12		
15		



Lesson 10:

Compare with lines and patterns generated by addition rules and multiplication rules.

Date:

1/31/14

engage^{ny}

6.B.60

A

Correct _____

Round to the nearest whole number.

1	3.1 ≈		23	12.51 ≈	
2	3.2 ≈		24	16.61 ≈	
3	3.3 ≈		25	17.41 ≈	
4	3.4 ≈		26	11.51 ≈	
5	3.5 ≈		27	11.49 ≈	
6	3.6 ≈		28	13.49 ≈	
7	3.9 ≈		29	13.51 ≈	
8	13.9 ≈		30	15.51 ≈	
9	13.1 ≈		31	15.49 ≈	
10	13.5 ≈		32	6.3 ≈	
11	7.5 ≈		33	7.6 ≈	
12	8.5 ≈		34	49.5 ≈	
13	9.5 ≈		35	3.45 ≈	
14	19.5 ≈		36	17.46 ≈	
15	29.5 ≈		37	11.76 ≈	
16	89.5 ≈		38	5.2 ≈	
17	2.4 ≈		39	12.8 ≈	
18	2.41 ≈		40	59.5 ≈	
19	2.42 ≈		41	5.45 ≈	
20	2.45 ≈		42	19.47 ≈	
21	2.49 ≈		43	19.87 ≈	
22	2.51 ≈		44	69.51 ≈	

B

Improvement _____

Correct _____

Round to the nearest whole number.

1	4.1 \approx		23	13.51 \approx	
2	4.2 \approx		24	17.61 \approx	
3	4.3 \approx		25	18.41 \approx	
4	4.4 \approx		26	12.51 \approx	
5	4.5 \approx		27	12.49 \approx	
6	4.6 \approx		28	14.49 \approx	
7	4.9 \approx		29	14.51 \approx	
8	14.9 \approx		30	16.51 \approx	
9	14.1 \approx		31	16.49 \approx	
10	14.5 \approx		32	7.3 \approx	
11	7.5 \approx		33	8.6 \approx	
12	8.5 \approx		34	39.5 \approx	
13	9.5 \approx		35	4.45 \approx	
14	19.5 \approx		36	18.46 \approx	
15	29.5 \approx		37	12.76 \approx	
16	79.5 \approx		38	6.2 \approx	
17	3.4 \approx		39	13.8 \approx	
18	3.41 \approx		40	49.5 \approx	
19	3.42 \approx		41	6.45 \approx	
20	3.45 \approx		42	19.48 \approx	
21	3.49 \approx		43	19.78 \approx	
22	3.51 \approx		44	59.51 \approx	

Name _____

Date _____

1. Complete the tables for the given rules.

Line ℓ

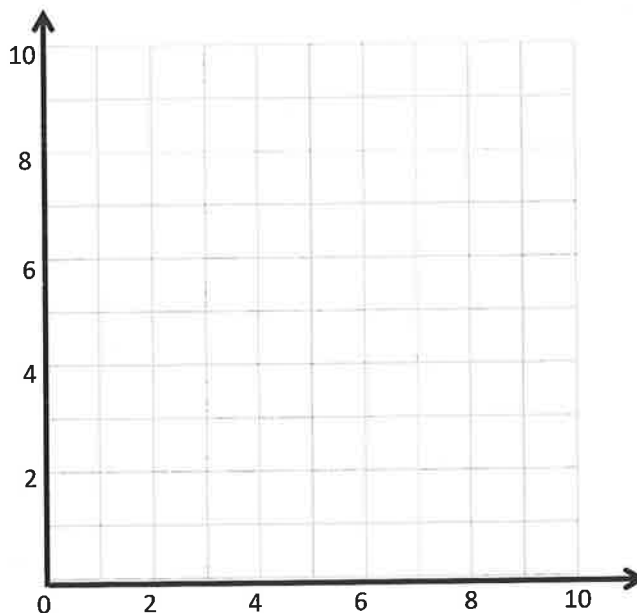
Rule: Double x

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: Double x , then add 1

x	y	(x, y)
0		
1		
2		
3		



- Draw each line on the coordinate plane above.
- Compare and contrast these lines.
- Based on the patterns you see, predict what the line for the rule *double x , then subtract 1* would look like. Draw the line on the plane above.

2. Circle the point(s) that the line for rule *multiply by $\frac{1}{3}$, then add 1* would contain.

$(0, \frac{1}{3})$

$(2, 1\frac{2}{3})$

$(1\frac{1}{2}, 1\frac{1}{2})$

$(2\frac{1}{4}, 2\frac{1}{4})$

- Explain how you know.

b. Give two other points that fall on this line.

3. Complete the tables for the given rules.

Line ℓ

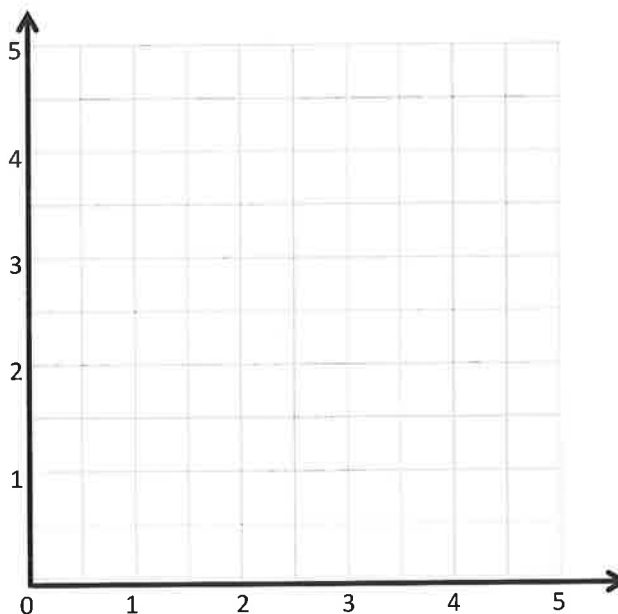
Rule: *Half x*

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: *Half x , then add $1\frac{1}{2}$*

x	y	(x, y)
0		
1		
2		
3		



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what the line for the rule *half x , then subtract 1* would look like. Draw the line on the plane above.

4. Circle the point(s) that the line for rule *multiply by $\frac{2}{3}$, then subtract 1* would contain.

$(1\frac{1}{3}, \frac{1}{9})$

$(2, \frac{1}{3})$

$(1\frac{3}{2}, 1\frac{1}{2})$

$(3, 1)$

a. Explain how you know.

b. Give two other points that fall on this line.

Name _____

Date _____

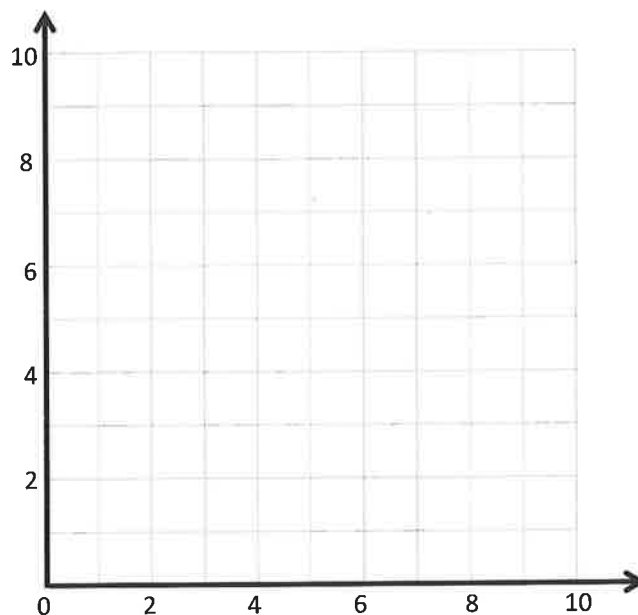
1. Complete the tables for the given rules.

Line ℓ Rule: Double x

x	y	(x, y)
1		
2		
3		

Line m Rule: Double x , then subtract 1

x	y	(x, y)
1		
2		
3		



- Draw each line on the coordinate plane above.
 - Compare and contrast these lines.
 - Based on the patterns you see, predict what the line for the rule *double x , then add 1* would look like. Draw your prediction on the plane above.
2. Circle the point(s) that the line for the rule *multiply by $\frac{1}{2}$ then add 1* would contain.
- $(0, \frac{1}{2})$ $(2, 1\frac{1}{4})$ $(2, 2)$ $(3, \frac{1}{2})$
- Explain how you know.
 - Give two other points that fall on this line.

3. Complete the tables for the given rules.

Line ℓ

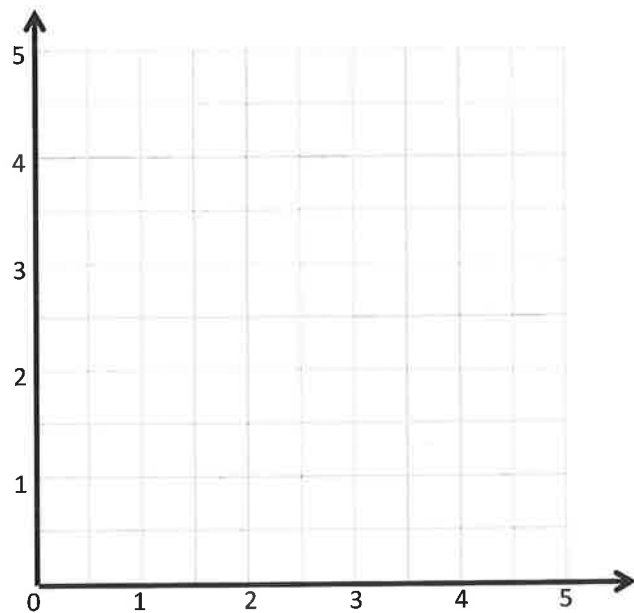
Rule: *Halve x , then add 1*

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: *Halve x , then add $1\frac{1}{4}$*

x	y	(x, y)
0		
1		
2		
3 ^{d.}		
e.		



- Draw each line on the coordinate plane above.
- Compare and contrast these lines.

- Based on the patterns you see, predict what the line for the rule *halve x , then subtract 1* would look like. Draw your prediction on the plane above.

4. Circle the point(s) that the line for rule *multiply by $\frac{3}{4}$, then subtract $\frac{1}{2}$* would contain.

$(1, \frac{1}{4})$

$(2, \frac{1}{4})$

$(3, 1\frac{3}{4})$

$(3, 1)$

- Explain how you know.

- Give two other points that fall on this line.

Line ℓ

Rule: Triple x

x	y	(x, y)
0		
1		
2		
4		

Line m

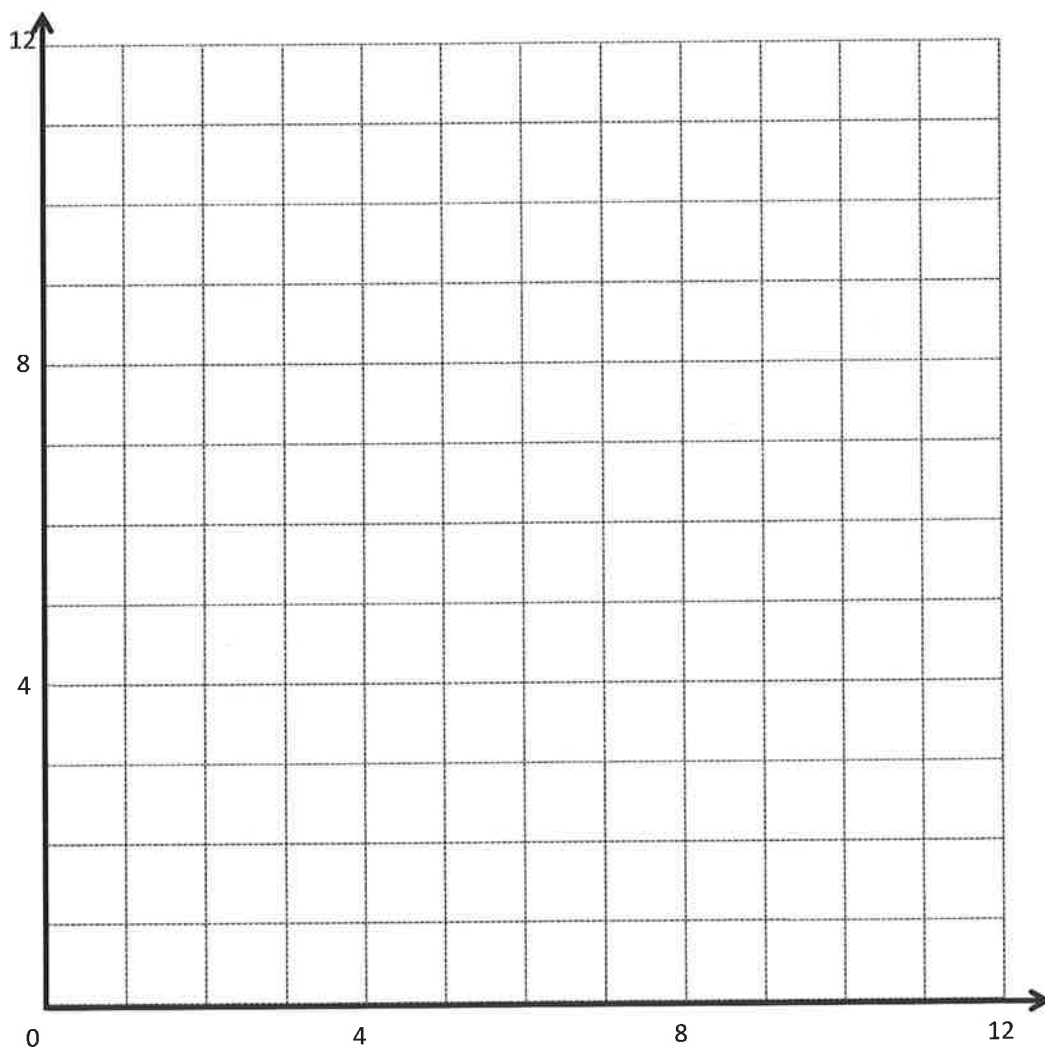
Rule: Triple x , then add 3

x	y	(x, y)
0		
1		
2		
3		

Line n

Rule: Triple x , then subtract 2

x	y	(x, y)
1		
2		
3		
4		



A

Correct _____

Subtract.

1	$5 - 1 =$	.	23	$7.985 - 0.002 =$	.
2	$5.9 - 1 =$	.	24	$7.985 - 0.004 =$	.
3	$5.93 - 1 =$	.	25	$2.7 - 0.1 =$	.
4	$5.932 - 1 =$	.	26	$2.785 - 0.1 =$	.
5	$5.932 - 2 =$	.	27	$2.785 - 0.5 =$	.
6	$5.932 - 4 =$	.	28	$4.913 - 0.4 =$	.
7	$0.5 - 0.1 =$	.	29	$3.58 - 0.01 =$	.
8	$0.53 - 0.1 =$	.	30	$3.586 - 0.01 =$	.
9	$0.539 - 0.1 =$	.	31	$3.586 - 0.05 =$	.
10	$8.539 - 0.1 =$	.	32	$7.982 - 0.04 =$	.
11	$8.539 - 0.2 =$	.	33	$6.126 - 0.001 =$	.
12	$8.539 - 0.4 =$	.	34	$6.126 - 0.004 =$	.
13	$0.05 - 0.01 =$	.	35	$9.348 - 0.006 =$	.
14	$0.057 - 0.01 =$	.	36	$8.347 - 0.3 =$	.
15	$1.057 - 0.01 =$	.	37	$9.157 - 0.05 =$	.
16	$1.857 - 0.01 =$	.	38	$6.879 - 0.009 =$	.
17	$1.857 - 0.02 =$	.	39	$6.548 - 2 =$	.
18	$1.857 - 0.04 =$	.	40	$6.548 - 0.2 =$	.
19	$0.005 - 0.001 =$	.	41	$6.548 - 0.02 =$	.
20	$7.005 - 0.001 =$	.	42	$6.548 - 0.002 =$	.
21	$7.905 - 0.001 =$	.	43	$6.196 - 0.06 =$	.
22	$7.985 - 0.001 =$	.	44	$9.517 - 0.004 =$	.

B

Improvement _____ # Correct _____

Subtract.

1	$6 - 1 =$	.	23	$7.986 - 0.002 =$	.
2	$6.9 - 1 =$	.	24	$7.986 - 0.004 =$	.
3	$6.93 - 1 =$	.	25	$3.7 - 0.1 =$	.
4	$6.932 - 1 =$	.	26	$3.785 - 0.1 =$	.
5	$6.932 - 2 =$	.	27	$3.785 - 0.5 =$	.
6	$6.932 - 4 =$	.	28	$5.924 - 0.4 =$	.
7	$0.6 - 0.1 =$	.	29	$4.58 - 0.01 =$	.
8	$0.63 - 0.1 =$	.	30	$4.586 - 0.01 =$	.
9	$0.639 - 0.1 =$	.	31	$4.586 - 0.05 =$	.
10	$8.639 - 0.1 =$	.	32	$6.183 - 0.04 =$	.
11	$8.639 - 0.2 =$	.	33	$7.127 - 0.001 =$	.
12	$8.639 - 0.4 =$	.	34	$7.127 - 0.004 =$	.
13	$0.06 - 0.01 =$	.	35	$1.459 - 0.006 =$	.
14	$0.067 - 0.01 =$	.	36	$8.457 - 0.4 =$	.
15	$1.067 - 0.01 =$	.	37	$1.267 - 0.06 =$	.
16	$1.867 - 0.01 =$	.	38	$7.981 - 0.001 =$	.
17	$1.867 - 0.02 =$	.	39	$7.548 - 2 =$	.
18	$1.867 - 0.04 =$	.	40	$7.548 - 0.2 =$	.
19	$0.006 - 0.001 =$	.	41	$7.548 - 0.02 =$	.
20	$7.006 - 0.001 =$	.	42	$7.548 - 0.002 =$	.
21	$7.906 - 0.001 =$	.	43	$7.197 - 0.06 =$	.
22	$7.986 - 0.001 =$	.	44	$1.627 - 0.004 =$	.

Name _____

Date _____

1. Write a rule for the line that contains the points $(0, \frac{3}{4})$ and $(2\frac{1}{2}, 2\frac{1}{4})$.

- a. Identify 2 more points on this line, then draw it on the grid below.

Point	x	y	(x, y)
B			
C			

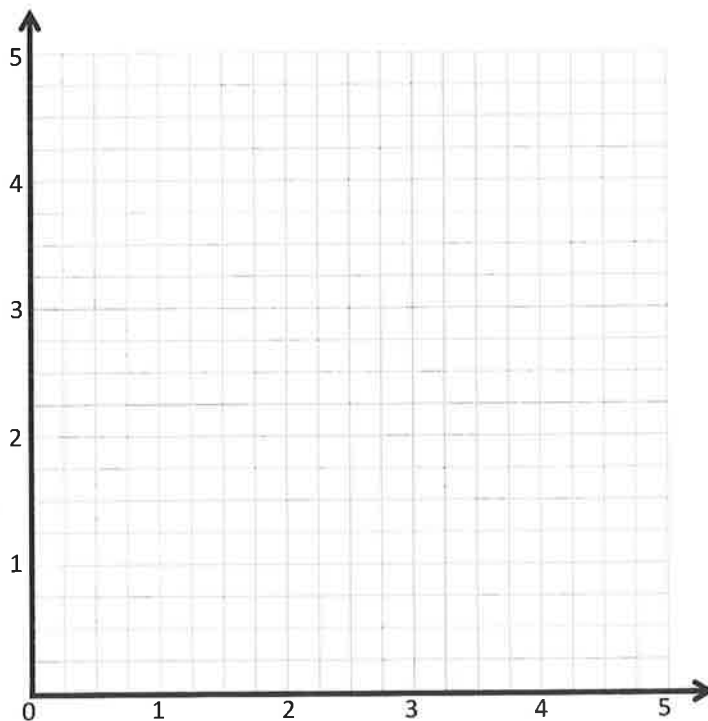
- b. Write a rule for a line that is parallel to \overleftrightarrow{BC} and goes through point $(1, \frac{1}{4})$.

2. Create a rule for the line that contains the points $(1, \frac{1}{4})$ and $(3, \frac{3}{4})$.

- a. Identify 2 more points on this line, then draw it on the grid at right.

Point	x	y	(x, y)
G			
H			

- b. Write a rule for a line that passes through the origin and lies between \overleftrightarrow{BC} and \overleftrightarrow{GH} .



3. Create a rule for a line that contains the point $(\frac{1}{4}, 1\frac{1}{4})$, using the operation or description below. Then, name 2 other points that would fall on each line.

a. Addition: _____

Point	x	y	(x, y)
T			
U			

b. A line parallel to the x -axis: _____

Point	x	y	(x, y)
G			
H			

c. Multiplication: _____

Point	x	y	(x, y)
A			
B			

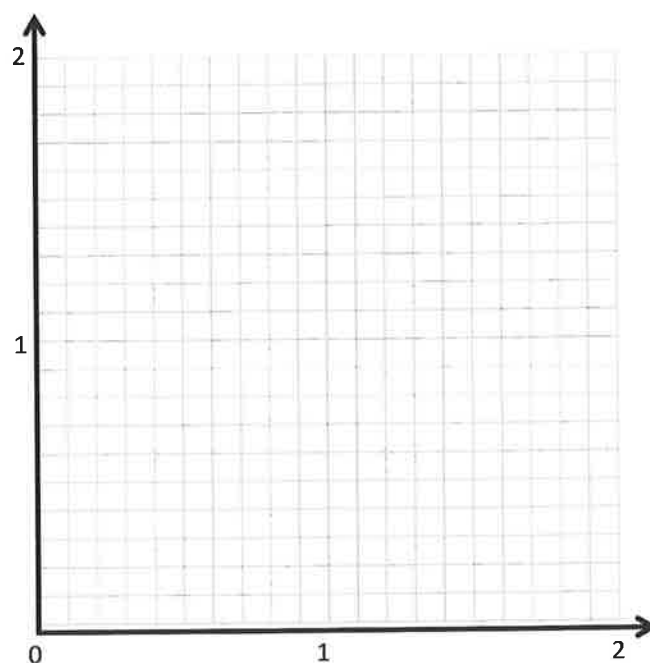
d. A line parallel to the y -axis: _____

Point	x	y	(x, y)
V			
W			

e. Multiplication with addition: _____

Point	x	y	(x, y)
R			
S			

4. Mrs. Boyd asked her students to give a rule that could describe a line that contains the point $(0.6, 1.8)$. Avi said the rule could be *multiply x by 3*. Ezra claims this could be a vertical line, and the rule could be *x is always 0.6*. Erik thinks the rule could be *add 1.2 to x* . Mrs. Boyd says that all the lines they are describing could describe a line that contains the point she gave. Explain how that is possible, and draw the lines on the coordinate plane to support your response.

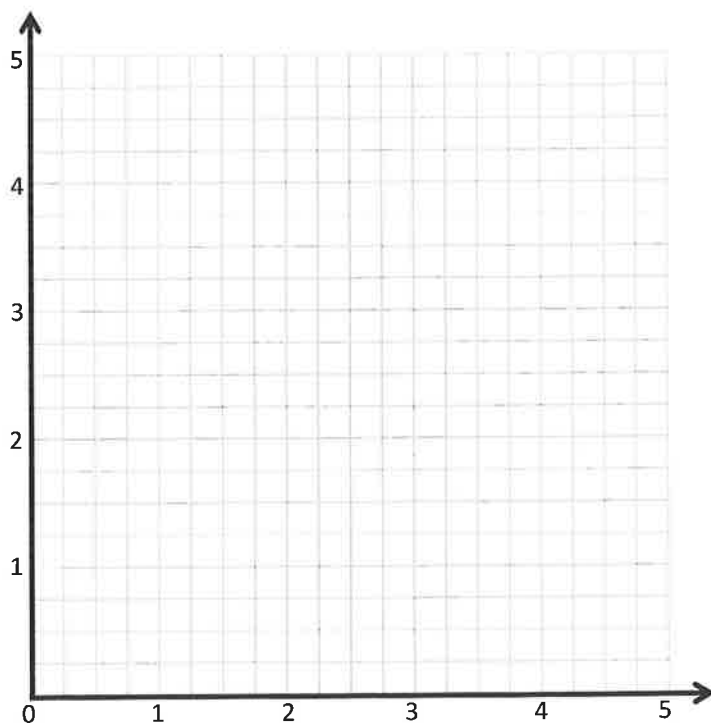


Challenge:

5. Create a mixed operation rule for the line that contains the points $(0, 1)$ and $(1, 3)$.

Point	x	y	(x, y)
O			
P			

- a. Identify 2 more points, O and P , on this line, and draw it on the grid.
- b. Write a rule for a line that is parallel to \overrightarrow{OP} and goes through point $(1, 2\frac{1}{2})$.



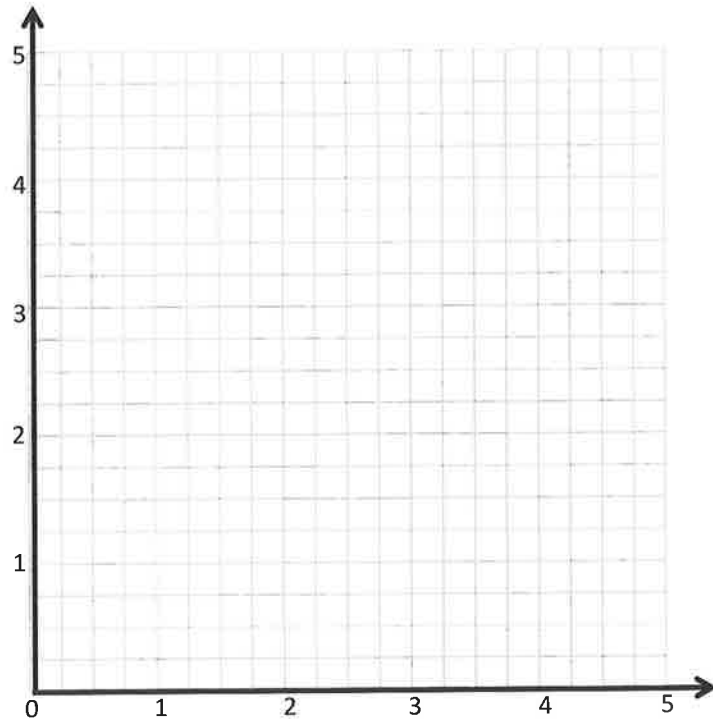
Name _____

Date _____

1. Write a rule for the line that contains the points $(0, \frac{1}{4})$ and $(2\frac{1}{2}, 2\frac{3}{4})$.

- a. Identify 2 more points on this line, then draw it on the grid below.

Point	x	y	(x, y)
B			
C			



- b. Write a rule for a line that is parallel to \overleftrightarrow{BC} and goes through point $(1, 2\frac{1}{4})$.

2. Give the rule for the line that contains the points $(1, 2\frac{1}{2})$ and $(2\frac{1}{2}, 2\frac{1}{2})$.

- a. Identify 2 more points on this line, then draw it on the grid above.

Point	x	y	(x, y)
G			
H			

- b. Write a rule for a line that is parallel to \overleftrightarrow{GH} .

3. Give the rule for a line that contains the point $(\frac{3}{4}, 1\frac{1}{2})$, using the operation or description below. Then, name 2 other points that would fall on each line.

a. Addition: _____

Point	x	y	(x, y)
T			
U			

b. A line parallel to the x -axis: _____

Point	x	y	(x, y)
G			
H			

c. Multiplication: _____

Point	x	y	(x, y)
A			
B			

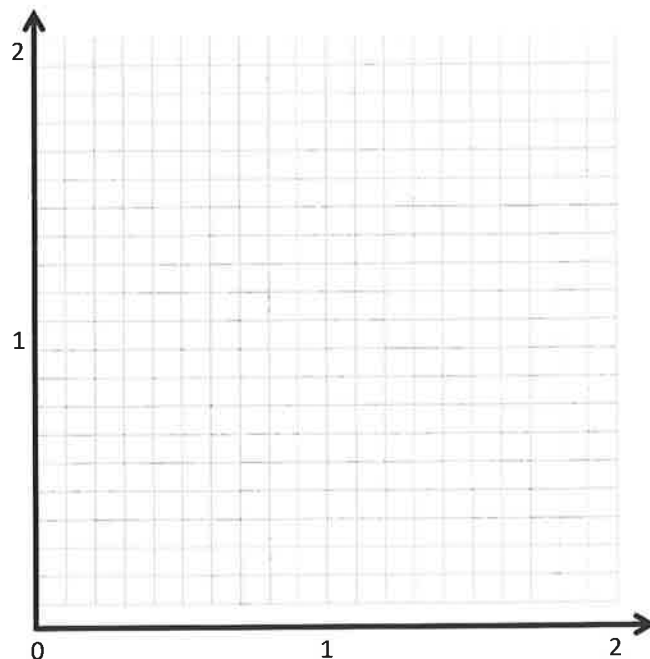
d. A line parallel to the y -axis: _____

Point	x	y	(x, y)
V			
W			

e. Multiplication with addition: _____

Point	x	y	(x, y)
R			
S			

4. On the grid, two lines intersect at $(1.2, 1.2)$. If line a passes through the origin, and line b contains the point at $(1.2, 0)$, write a rule for line a and line b .

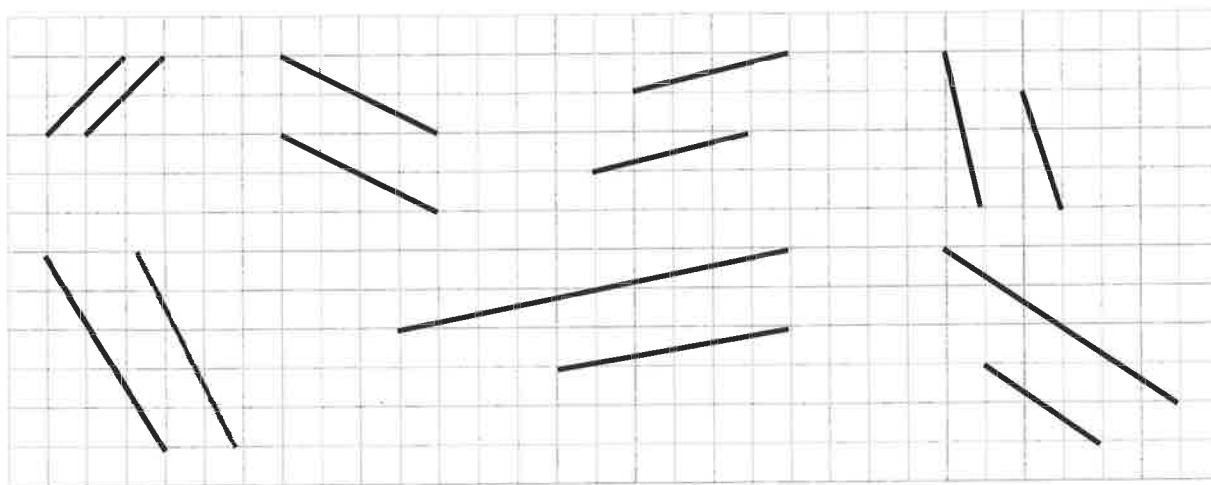


Name _____

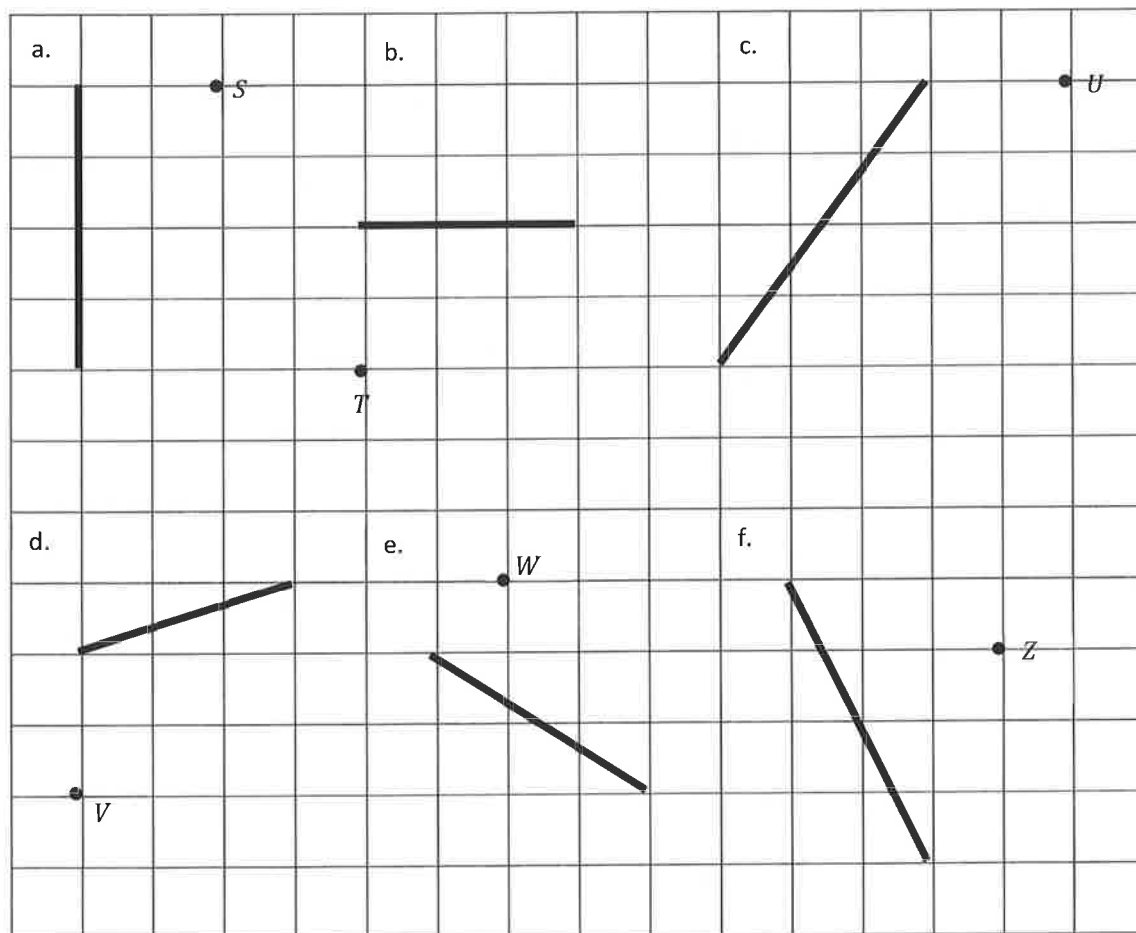
Date _____

1. Use a right angle template and straightedge to draw at least four sets of parallel lines in the space below.

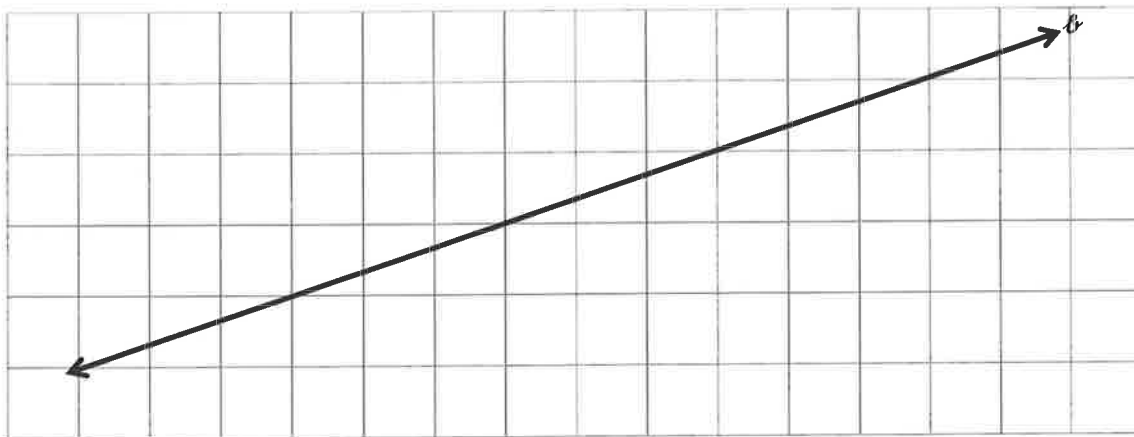
2. Circle the segments that are parallel.



3. Use your straightedge to draw a segment parallel to each segment through the given point.



4. Draw 2 different lines parallel to line ℓ .

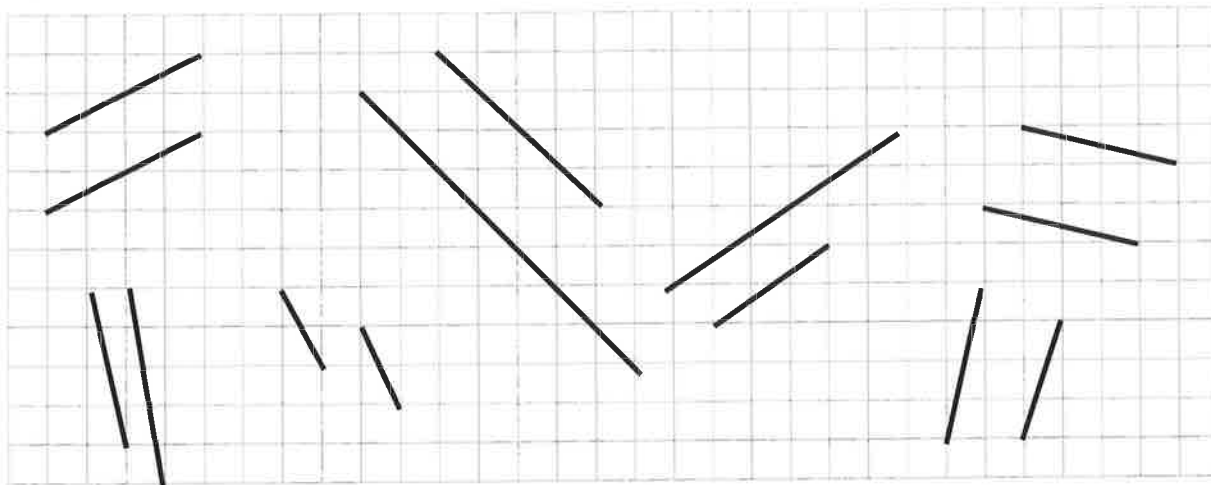


Name _____

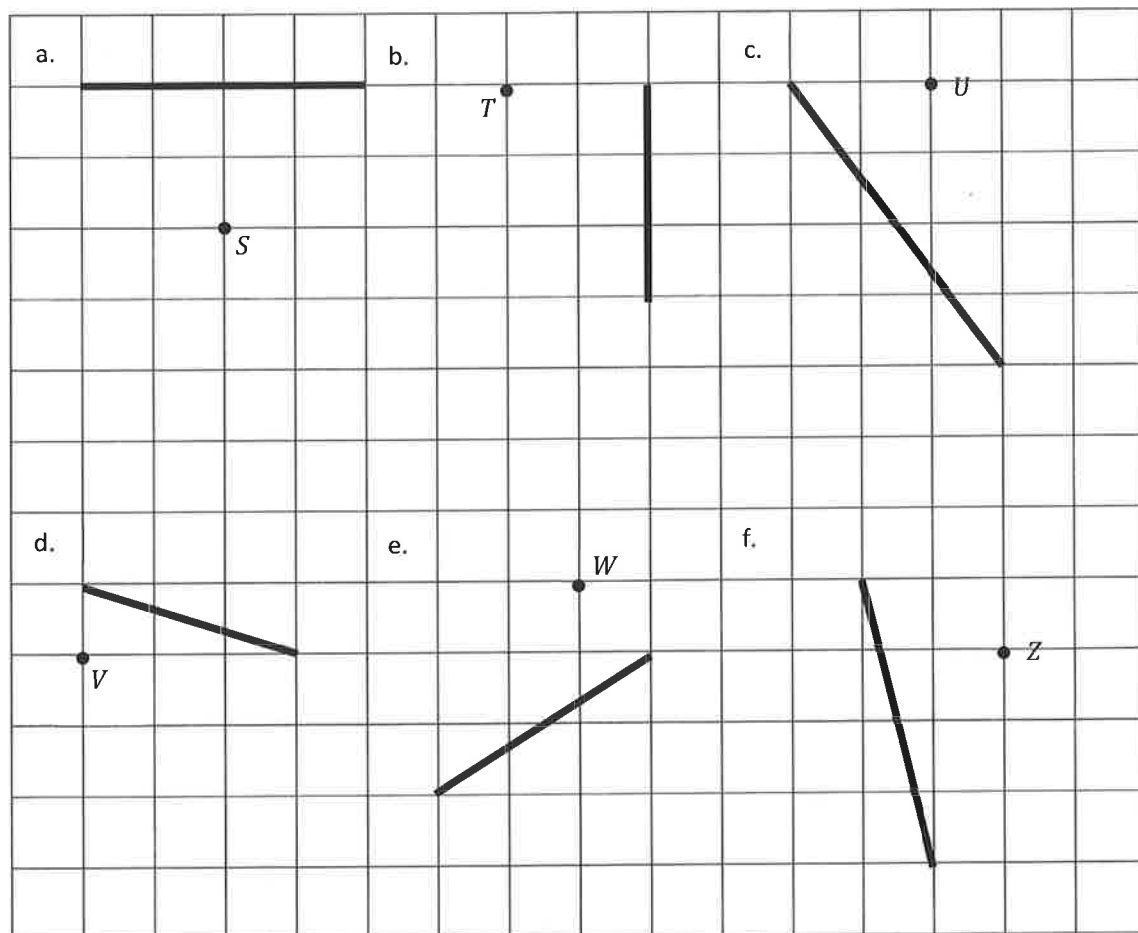
Date _____

1. Use your right angle template and straightedge to draw at least three sets of parallel lines in the space below.

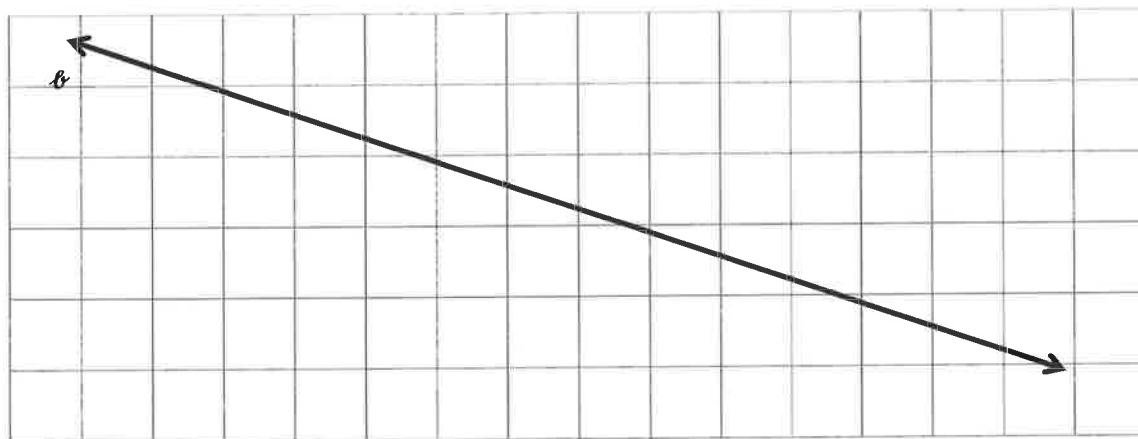
2. Circle the segments that are parallel.

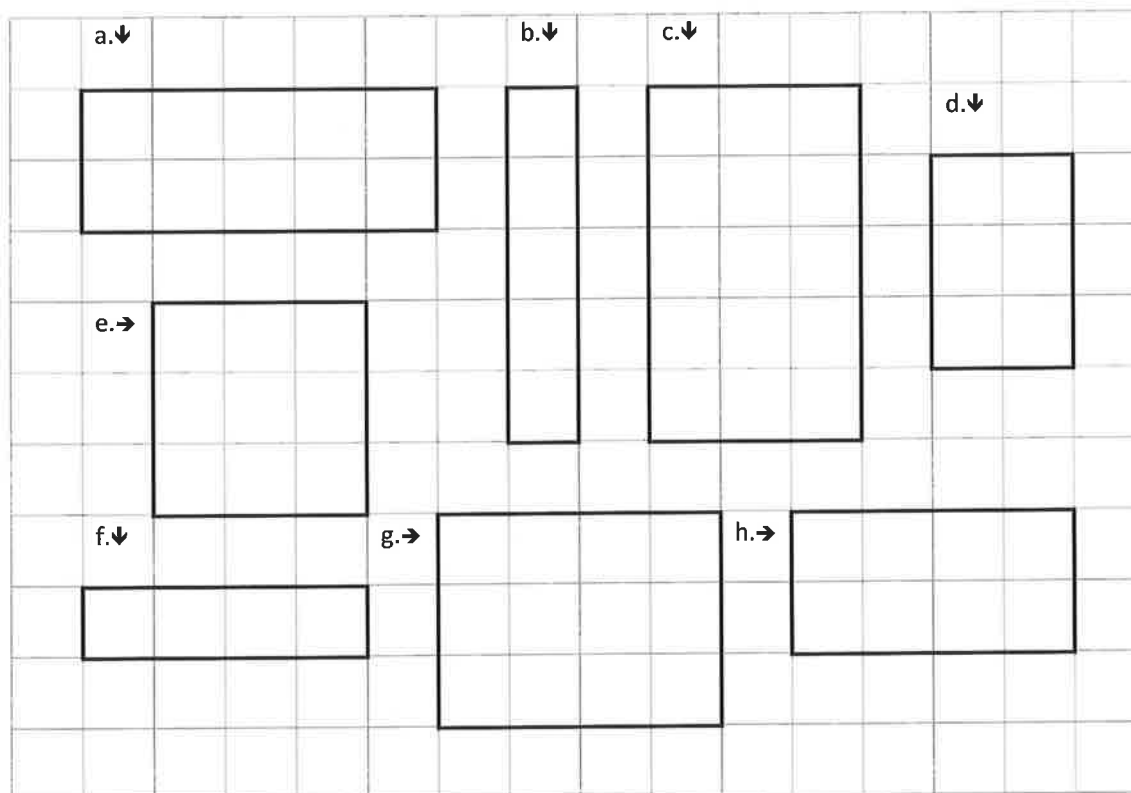


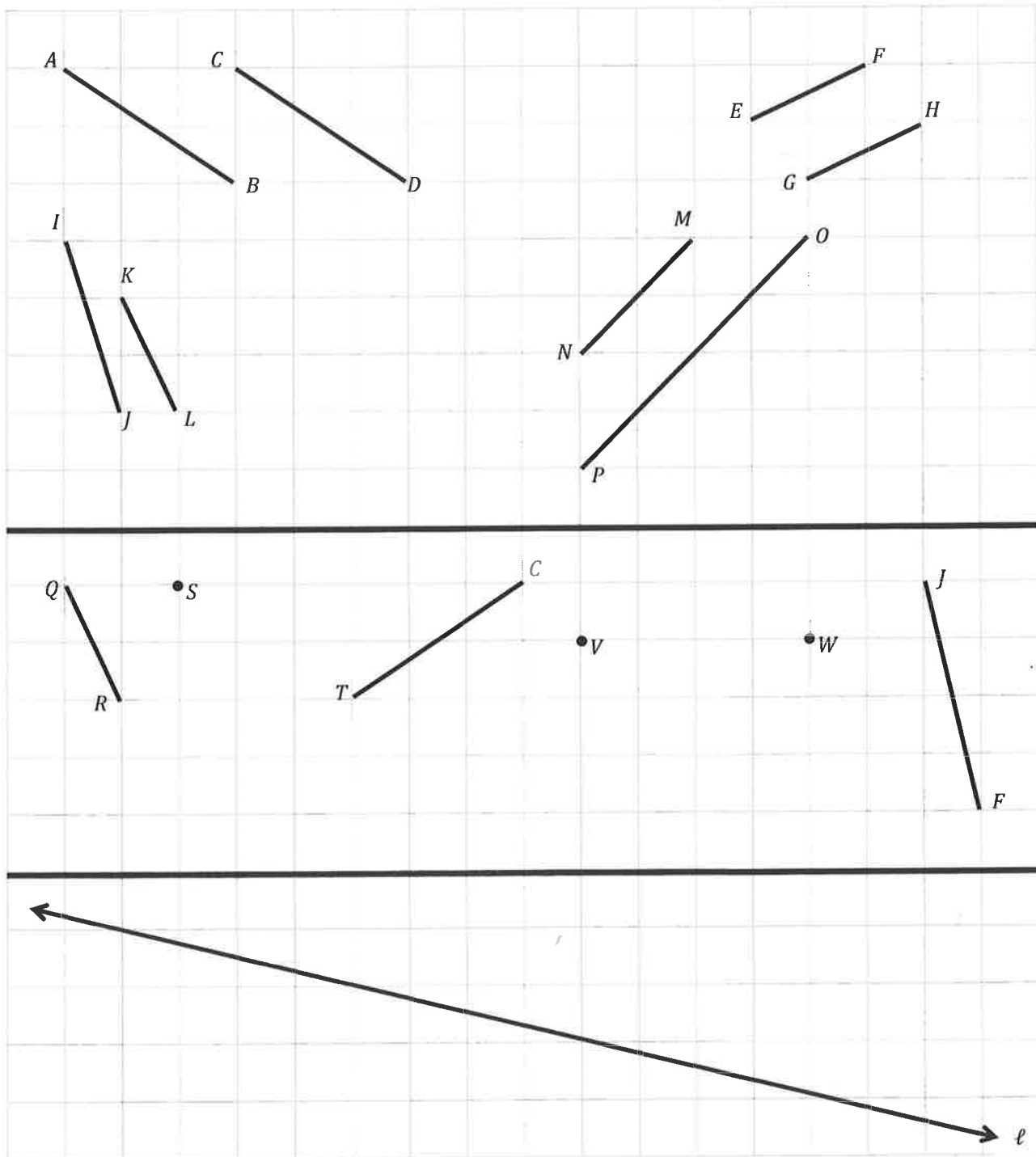
3. Use your straightedge to draw a segment parallel to each segment through the given point.



4. Draw 2 different lines parallel to line ℓ .



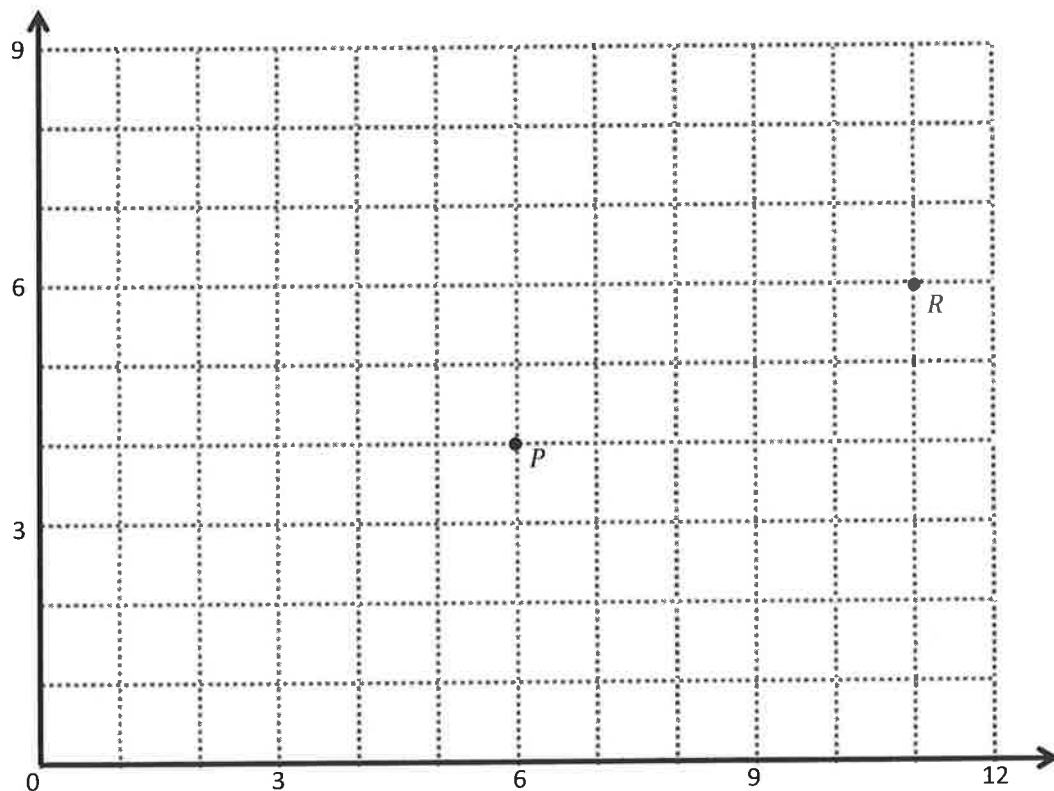




Name _____

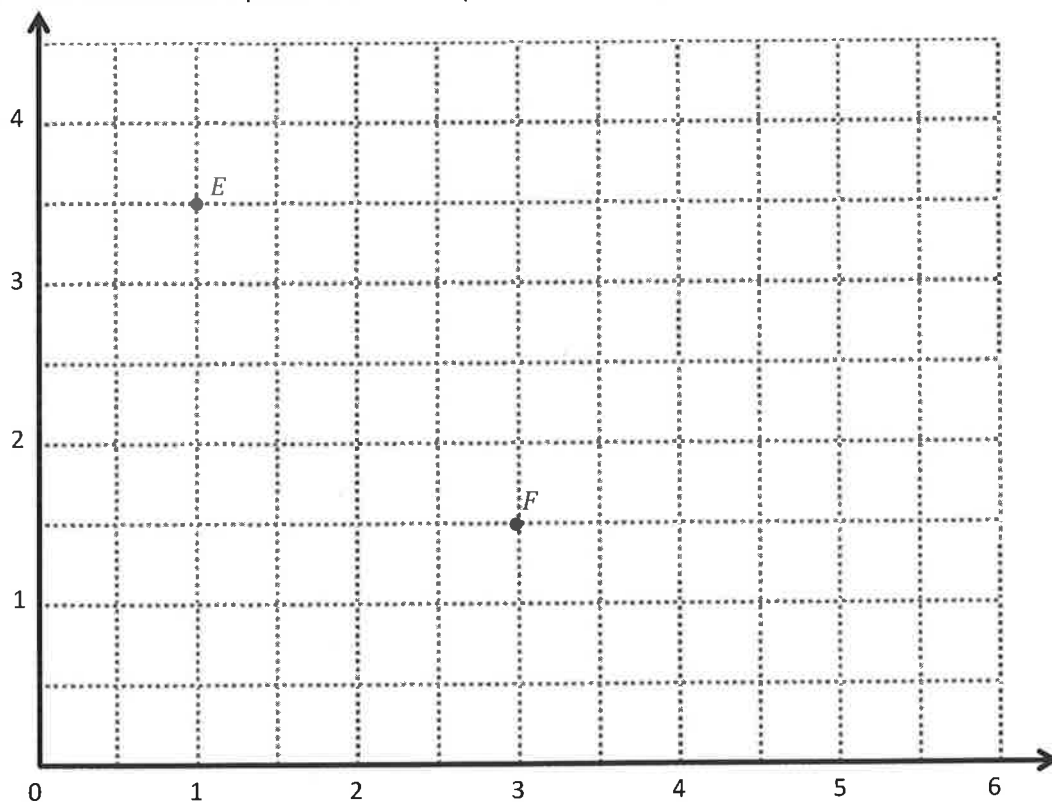
Date _____

1. Use the coordinate plane below to complete the following tasks.



- Identify the locations of P and R . P : (____, ____) R : (____, ____)
- Draw \overrightarrow{PR} .
- Plot the following coordinate pairs on the plane.
 S : (6, 7) T : (11, 9)
- Draw \overrightarrow{ST} .
- Circle the relationship between \overrightarrow{PR} and \overrightarrow{ST} . $\overrightarrow{PR} \perp \overrightarrow{ST}$ $\overrightarrow{PR} \parallel \overrightarrow{ST}$
- Give the coordinates of a pair of points, U and V , such that $\overrightarrow{UV} \parallel \overrightarrow{PR}$.
 U : (____, ____) V : (____, ____)
- Draw \overrightarrow{UV} .

2. Use the coordinate plane below to complete the following tasks.



- Identify the locations of E and F . $E: (\underline{\quad}, \underline{\quad})$ $F: (\underline{\quad}, \underline{\quad})$
- Draw \overleftrightarrow{EF} .
- Generate coordinate pairs for L and M , such that $\overleftrightarrow{EF} \parallel \overleftrightarrow{LM}$.
 $L: (\underline{\quad}, \underline{\quad})$ $M: (\underline{\quad}, \underline{\quad})$
- Draw \overleftrightarrow{LM} .
- Explain the pattern you made use of when generating coordinate pairs for L and M .
- Give the coordinates of a point, H , such that $\overleftrightarrow{EF} \parallel \overleftrightarrow{GH}$.

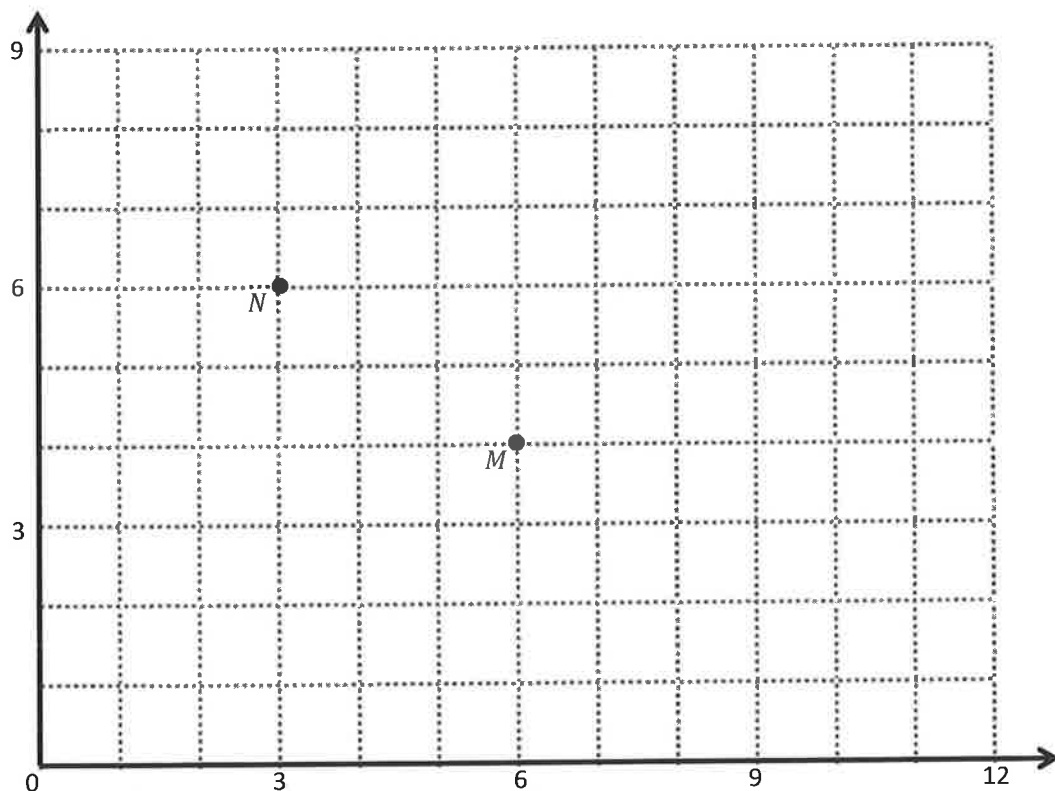
$$G: (1\frac{1}{2}, 4) \quad H: (\underline{\quad}, \underline{\quad})$$

- Explain how you chose the coordinates for H .

Name _____

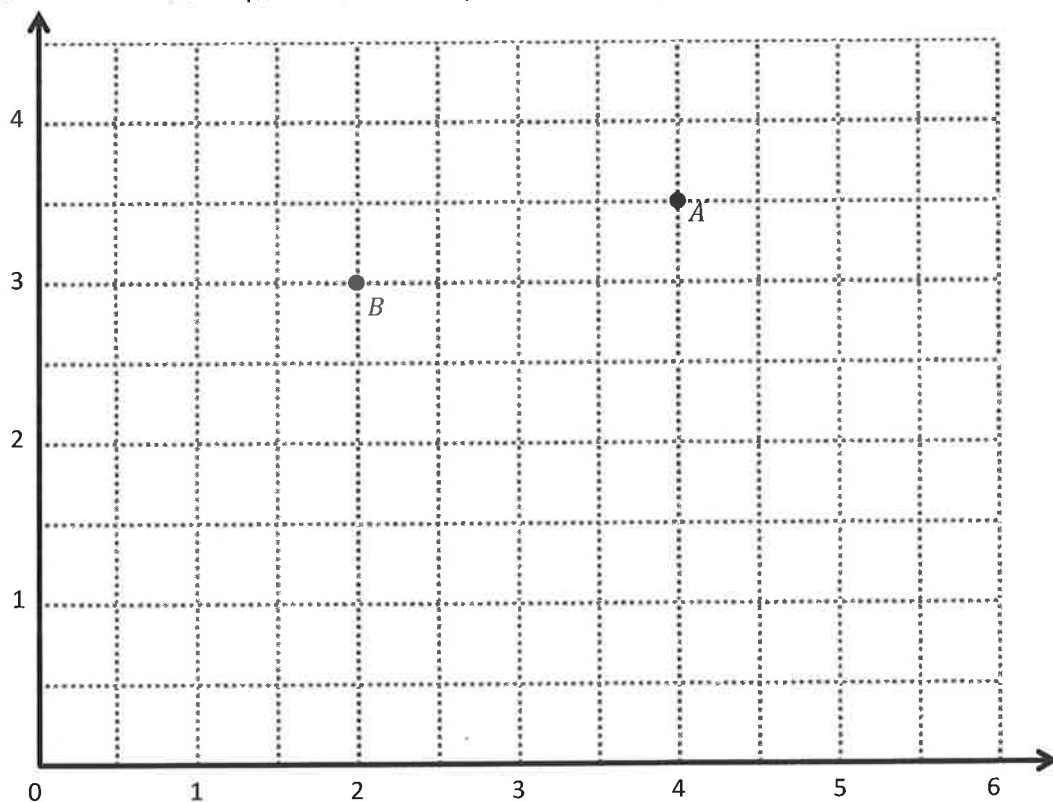
Date _____

1. Use the coordinate plane below to complete the following tasks.



- Identify the locations of M and N . M : (____, ____) N : (____, ____)
- Draw \overline{MN} .
- Plot the following coordinate pairs on the plane.
 J : (5, 7) K : (8, 5)
- Draw \overline{JK} .
- Circle the relationship between \overline{MN} and \overline{JK} . $\overline{MN} \perp \overline{JK}$ $\overline{MN} \parallel \overline{JK}$
- Give the coordinates of a pair of points, F and G , such that $\overline{FG} \parallel \overline{MN}$.
 F : (____, ____) G : (____, ____)
- Draw \overline{FG} .

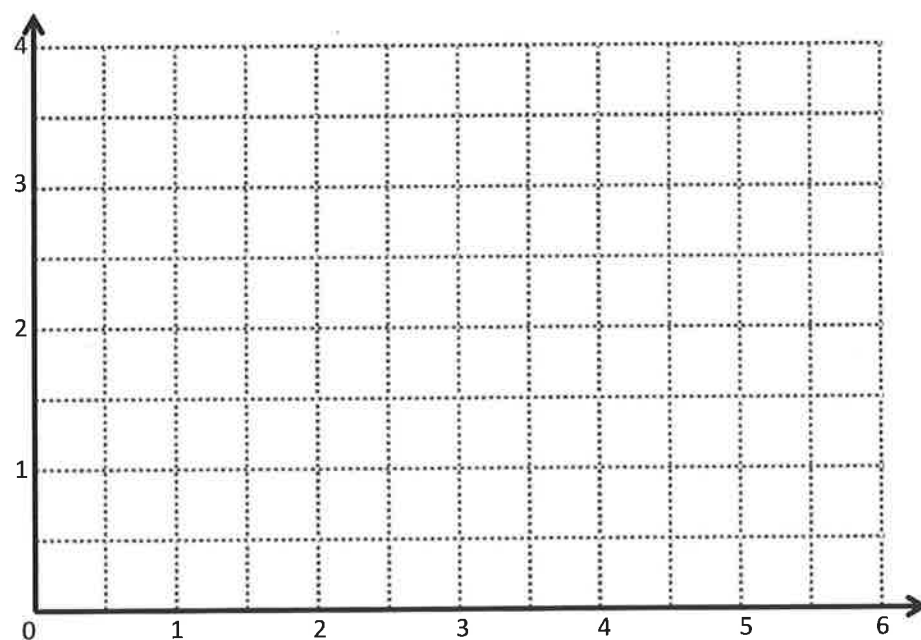
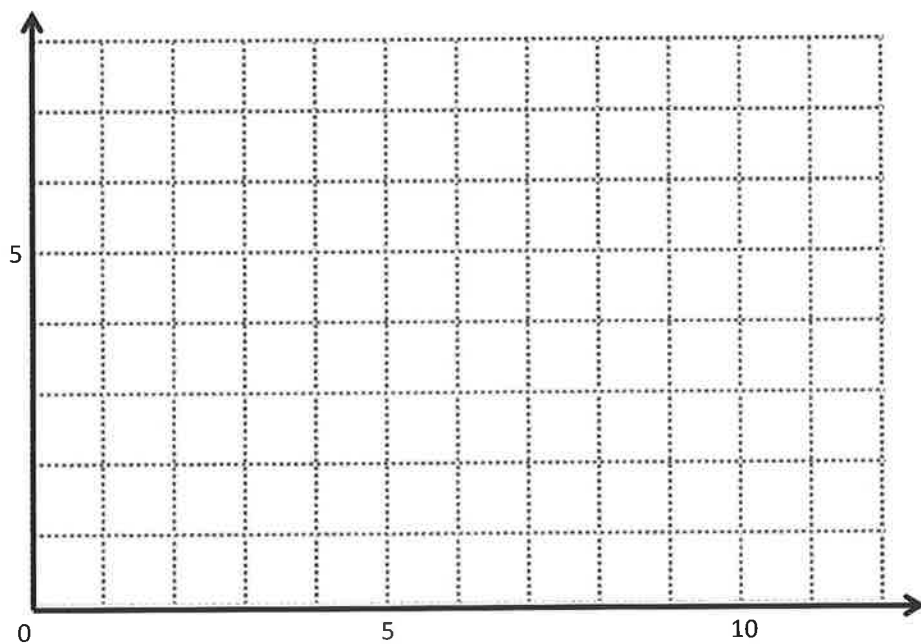
2. Use the coordinate plane below to complete the following tasks.

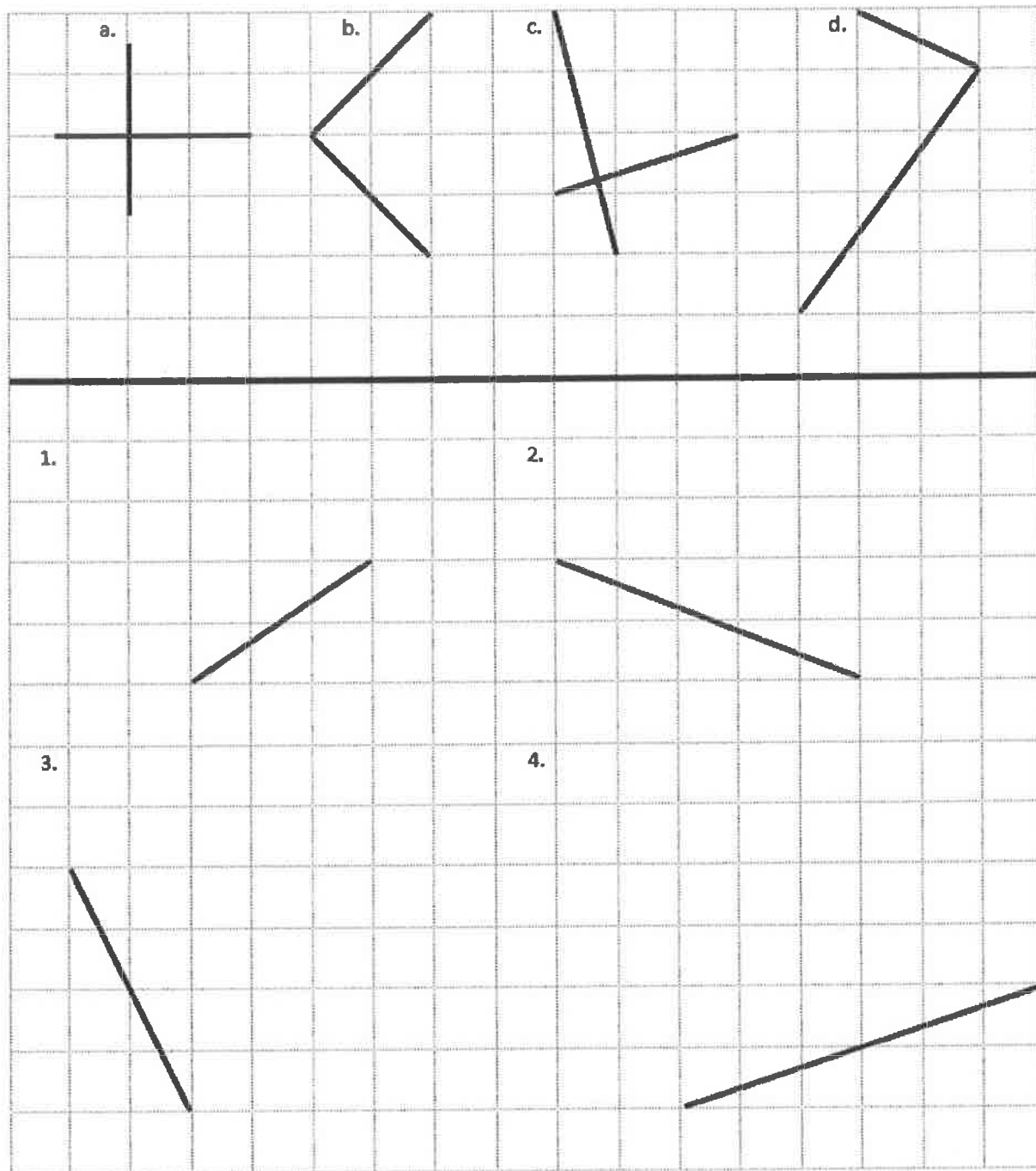


- Identify the locations of A and B . $A: (\underline{\quad}, \underline{\quad})$ $B: (\underline{\quad}, \underline{\quad})$
- Draw \overrightarrow{AB} .
- Generate coordinate pairs for C and D , such that $\overrightarrow{AB} \parallel \overrightarrow{CD}$.
 $C: (\underline{\quad}, \underline{\quad})$ $D: (\underline{\quad}, \underline{\quad})$
- Draw \overrightarrow{CD} .
- Explain the pattern you used when generating coordinate pairs for C and D .
- Give the coordinates of a point, F , such that $\overrightarrow{AB} \parallel \overrightarrow{EF}$.

$$E: (2\frac{1}{2}, 2\frac{1}{2}) \quad F: (\underline{\quad}, \underline{\quad})$$

- Explain how you chose the coordinates for F .

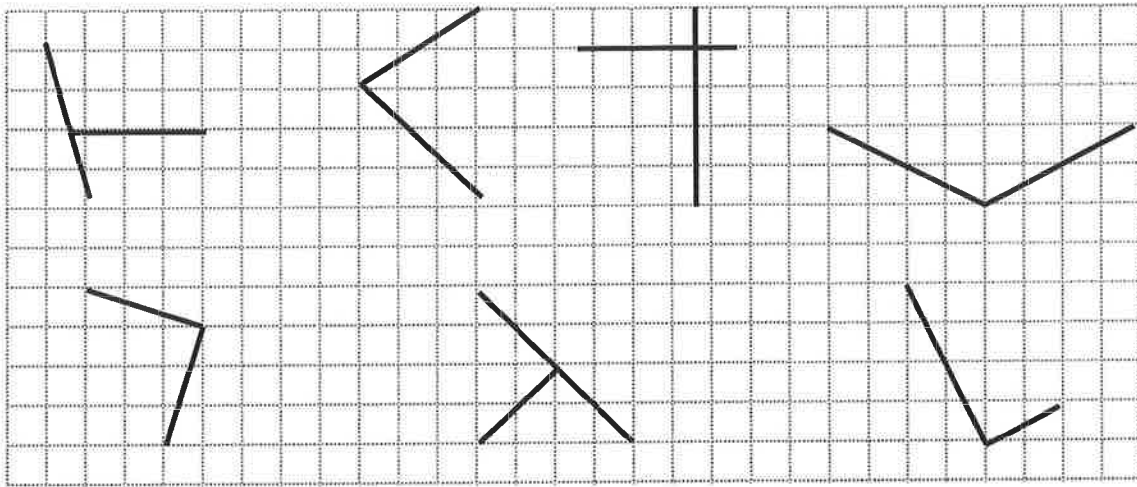




Name _____

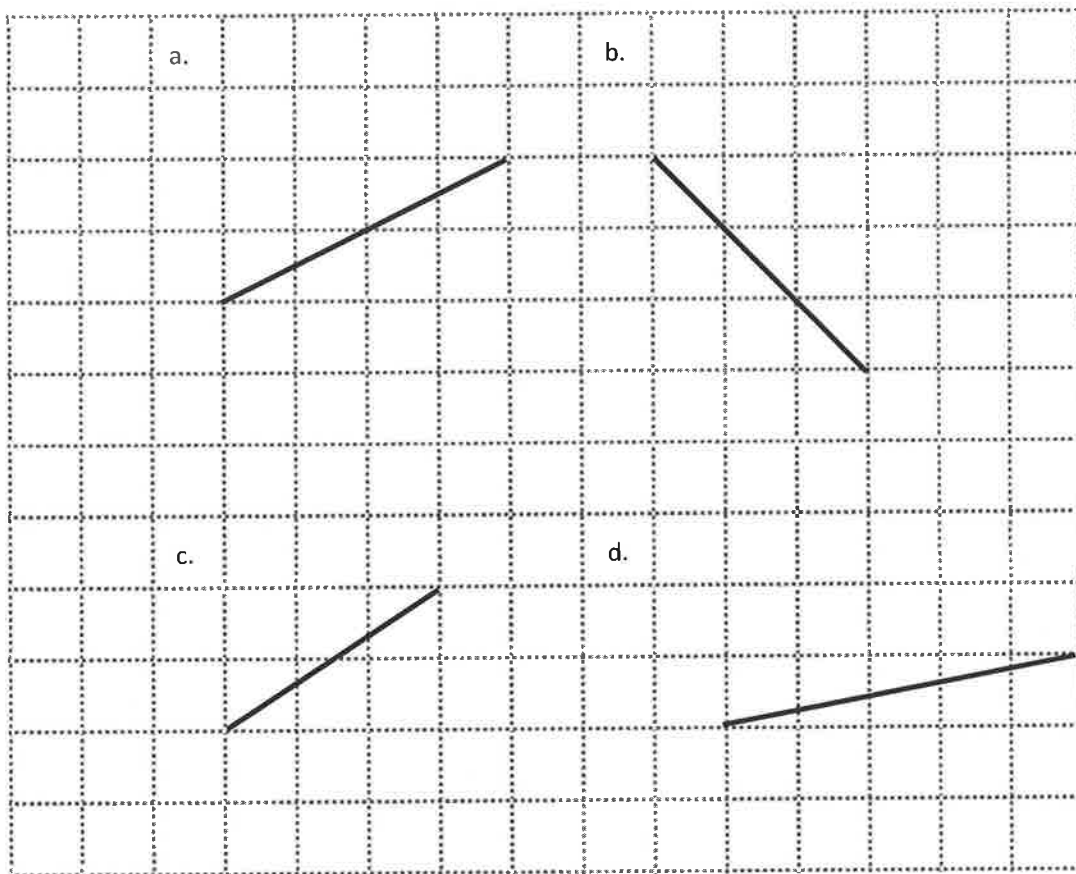
Date _____

1. Circle the pairs of segments that are perpendicular.

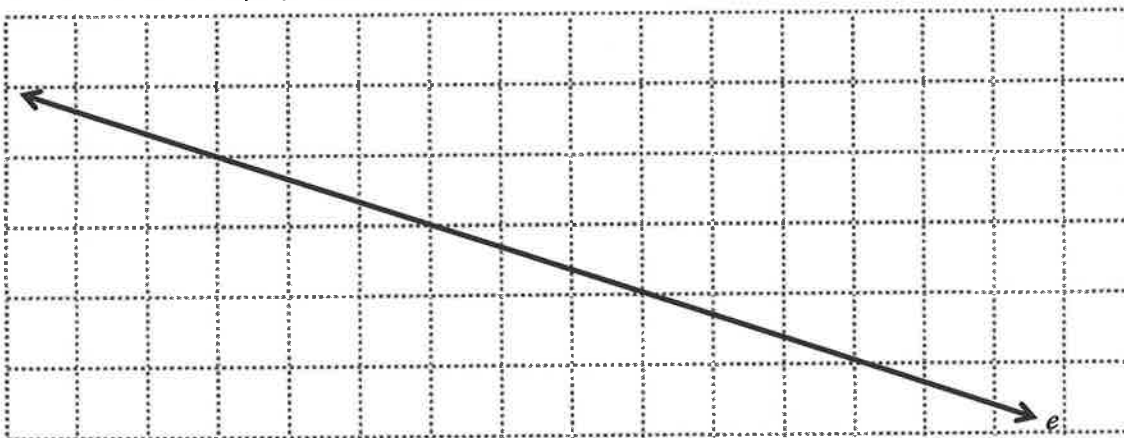


2. In the space below, use your right triangle templates to draw at least 3 different sets of perpendicular lines.

3. Draw a segment perpendicular to each given segment. Show your thinking by sketching triangles as needed.



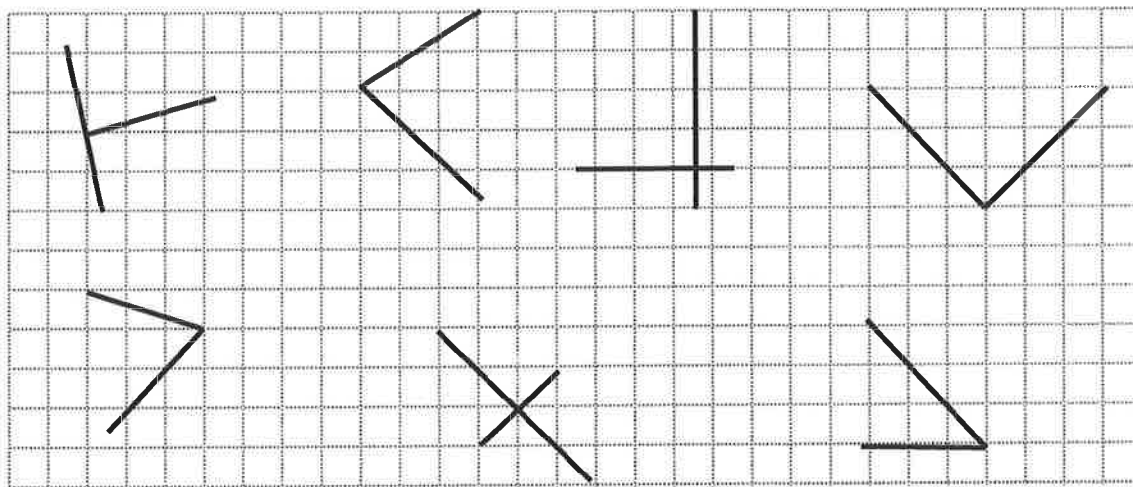
4. Draw 2 different lines perpendicular to line e .



Name _____

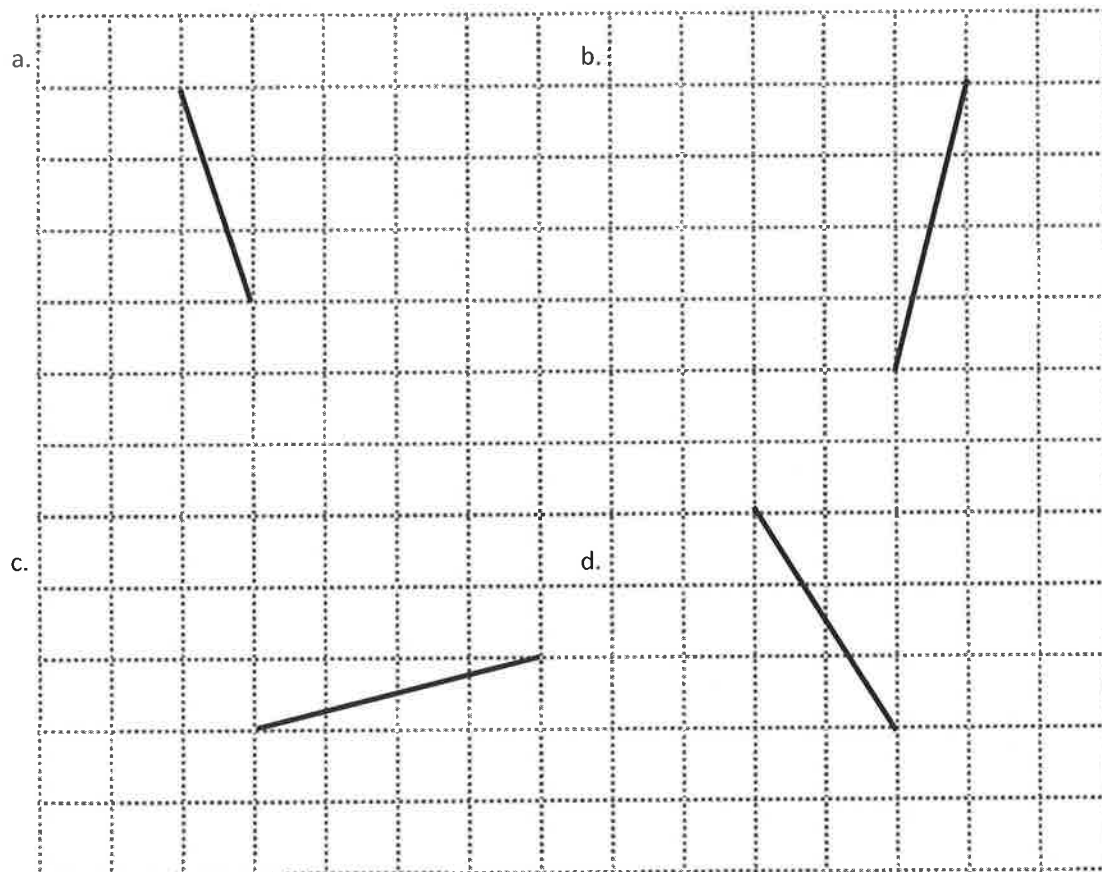
Date _____

1. Circle the pairs of segments that are perpendicular.

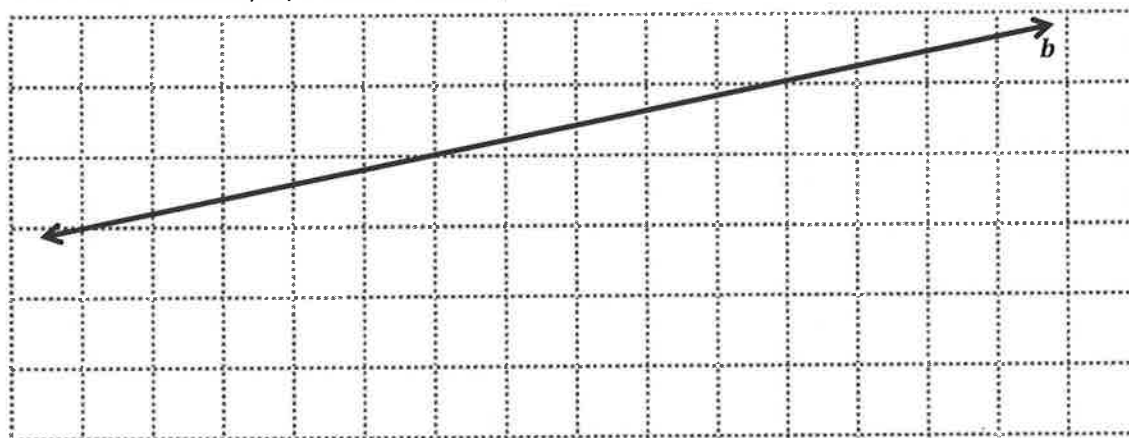


2. In the space below, use your right triangle templates to draw at least 3 different sets of perpendicular lines.

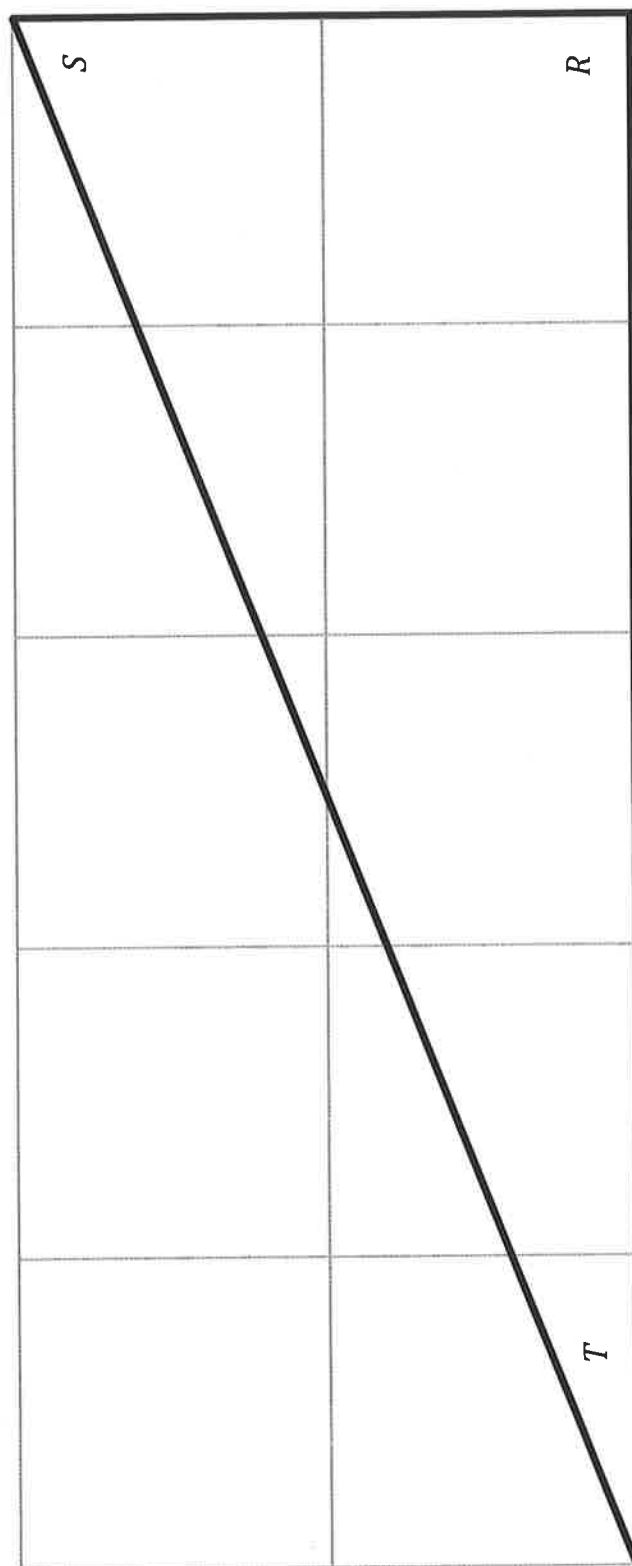
3. Draw a segment perpendicular to each given segment. Show your thinking by sketching triangles as needed.

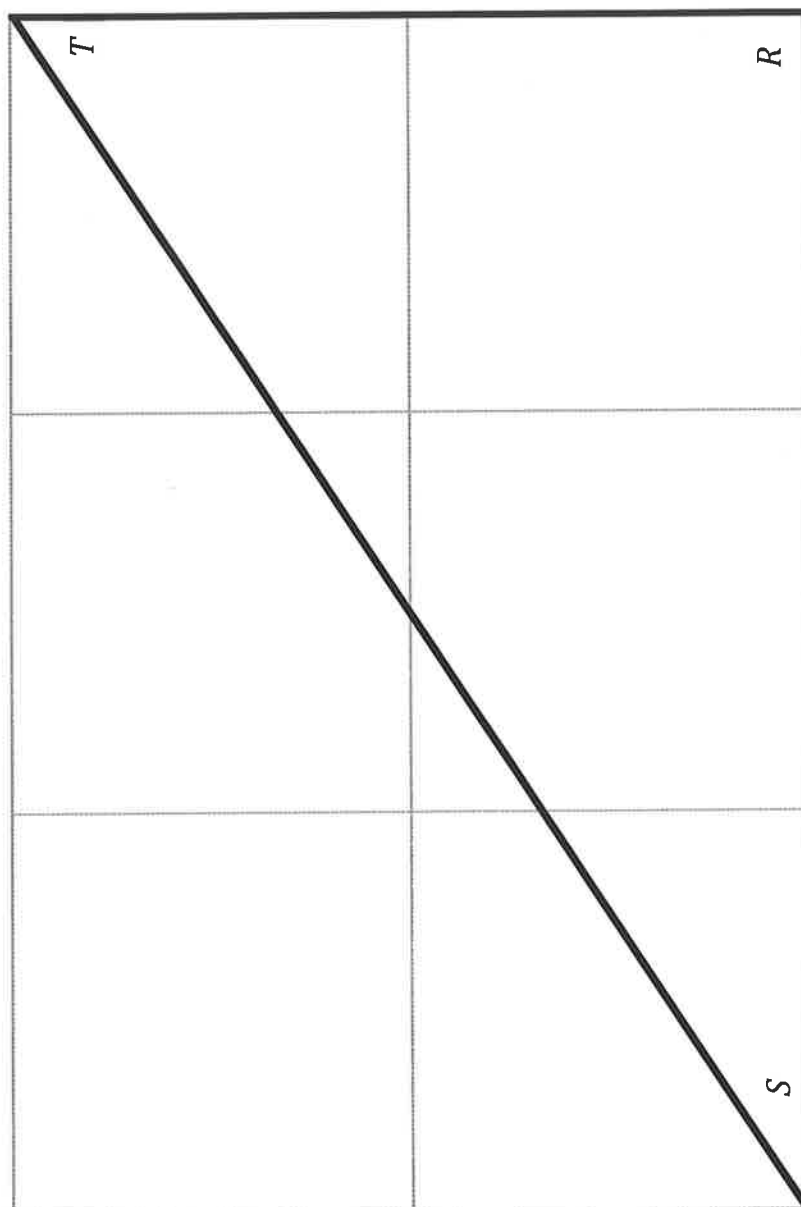


4. Draw 2 different lines perpendicular to line b .



Triangle RST Template A



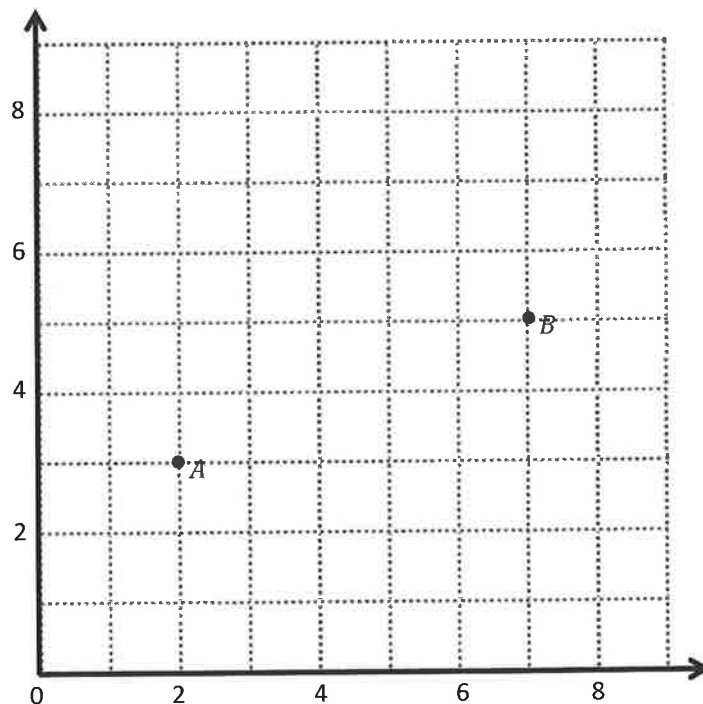
Triangle RST Template B

Name _____

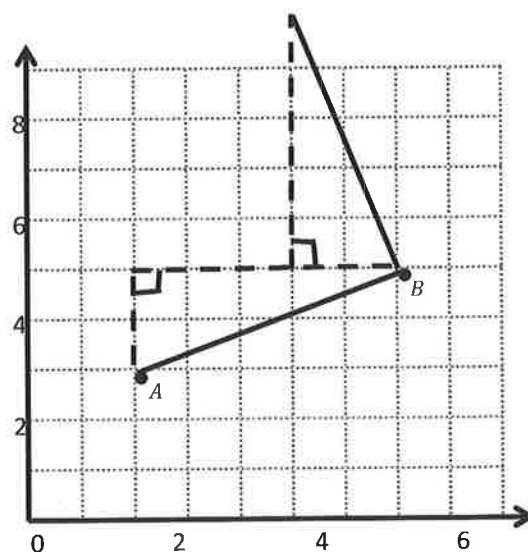
Date _____

1. Use the coordinate plane below to complete the following tasks.

- Draw \overline{AB} .
- Plot point $C (0, 8)$.
- Draw \overline{AC} .
- Explain how you know $\angle CAB$ is a right angle without measuring it.

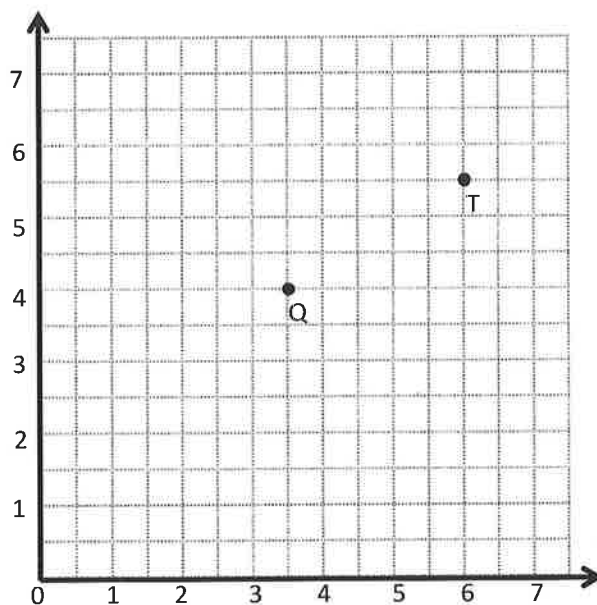


- Sean drew the picture to the right to find a segment perpendicular to \overline{AB} . Explain why Sean is correct.



2. Use the coordinate plane below to complete the following tasks.

- Draw \overline{QT} .
- Plot point $R(2, 6\frac{1}{2})$.
- Draw \overline{QR} .
- Explain how you know $\angle RQT$ is a right angle without measuring it.
- Compare the coordinates of points Q and T . What is the difference of the x -coordinates? The y -coordinates?
- Compare the coordinates of points Q and R . What is the difference of the x -coordinates? The y -coordinates?
- What is the relationship of the differences you found in (e) and (f) to the triangles of which these two segments are a part?



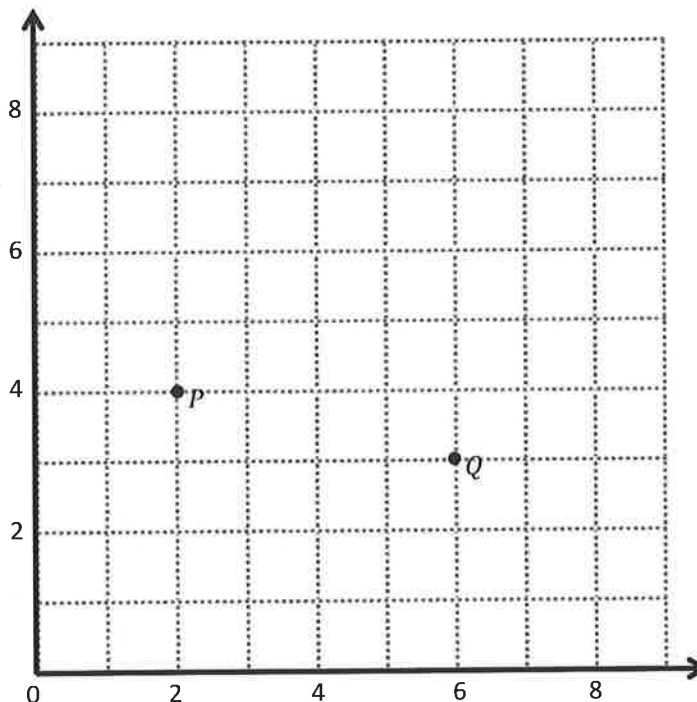
3. \overleftrightarrow{EF} contains the following points. $E: (4, 1)$ $F: (8, 7)$
- Give the coordinates of a pair of points G and H , such that $\overleftrightarrow{EF} \perp \overleftrightarrow{GH}$.
- $G: (\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$ $H: (\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

Name _____

Date _____

1. Use the coordinate plane below to complete the following tasks.

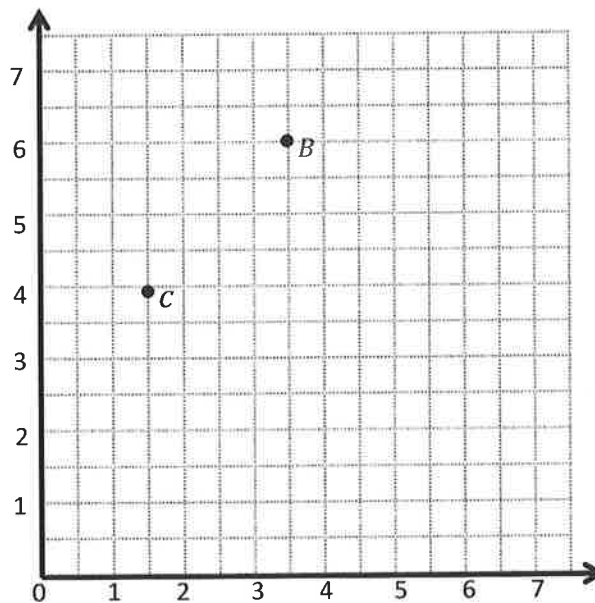
- a. Draw \overline{PQ} .
- b. Plot point $R(7, 7)$.
- c. Draw \overline{PR} .
- d. Explain how you know $\angle PQR$ is a right angle without measuring it.



- e. Compare the coordinates of points P and Q . What is the difference of the x -coordinates? The y -coordinates?
- f. Compare the coordinates of points P and R . What is the difference of the x -coordinates? The y -coordinates?
- g. What is the relationship of the differences you found in (e) and (f) to the triangles of which these two segments are a part?

2. Use the coordinate plane below to complete the following tasks.

- Draw \overline{BC} .
- Plot point $D(3, 2\frac{1}{2})$.
- Draw \overline{BD} .
- Explain how you know $\angle BCD$ is a right angle without measuring it.



- Compare the coordinates of points B and C . What is the difference of the x -coordinates? The y -coordinates?

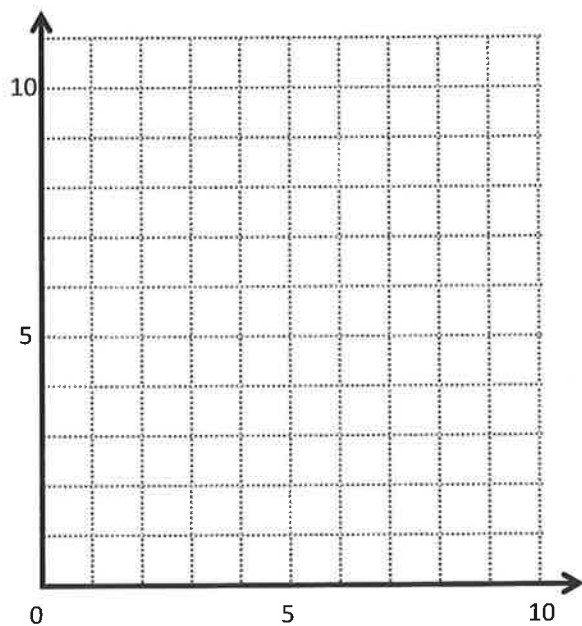
- Compare the coordinates of points B and D . What is the difference of the x -coordinates? The y -coordinates?

- What is the relationship of the differences you found in (e) and (f) to the triangles of which these two segments are a part?

3. \overrightarrow{ST} contains the following points. $S: (2, 3)$ $T: (9, 6)$

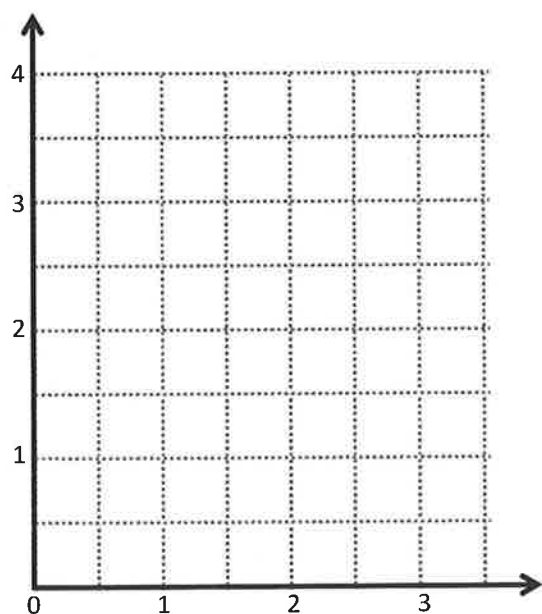
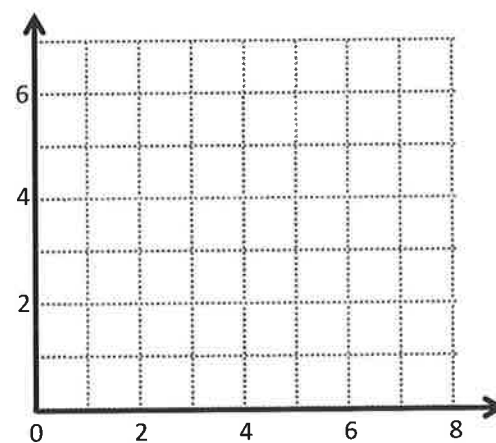
- Give the coordinates of a pair of points, U and V , such that $\overrightarrow{ST} \perp \overrightarrow{UV}$.

$S: (\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$ $T: (\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$



	(x, y)
A	
B	
C	

	(x, y)
D	
E	
F	

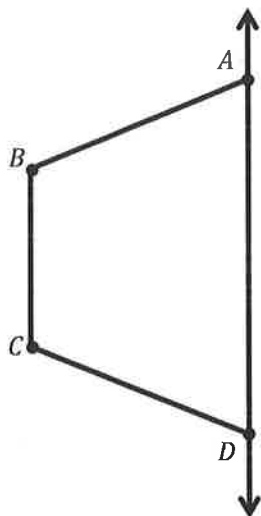


	(x, y)
G	
H	
I	

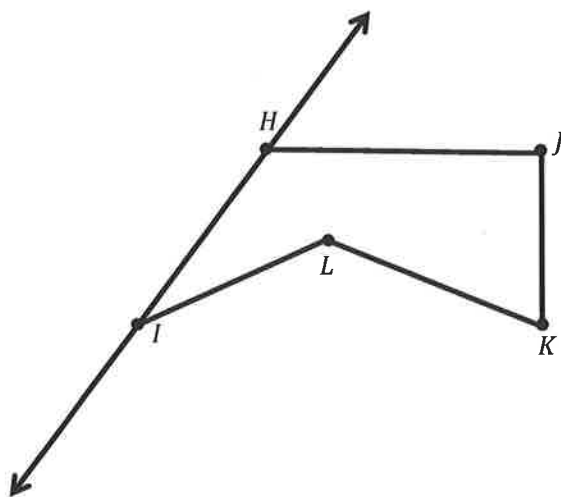
Name _____

Date _____

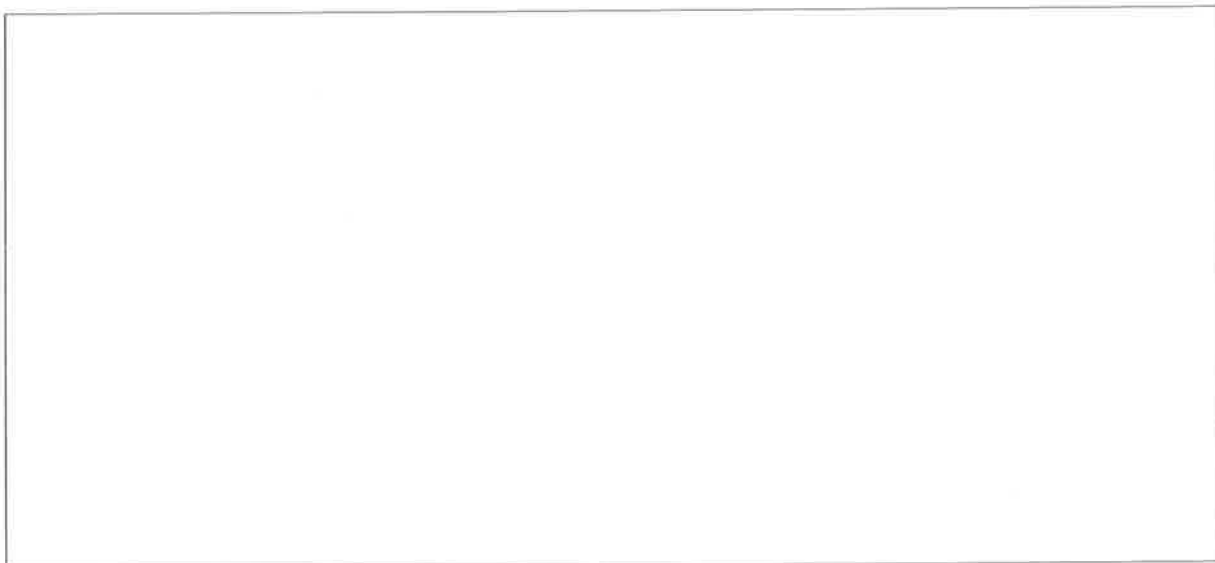
1. Draw to create a figure that is symmetric about \overleftrightarrow{AD} .



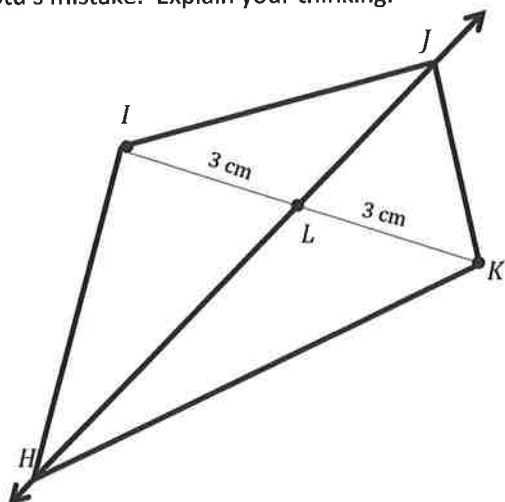
2. Draw precisely to create a figure that is symmetric about \overleftrightarrow{HI} .



3. Complete the following construction in the space below.
- Plot 3 non-collinear points D , E , and F .
 - Draw \overline{DE} , \overline{EF} , and \overline{DF} .
 - Plot point G , and draw the remaining sides, such that quadrilateral $DEFG$ is symmetric about \overleftrightarrow{DF} .



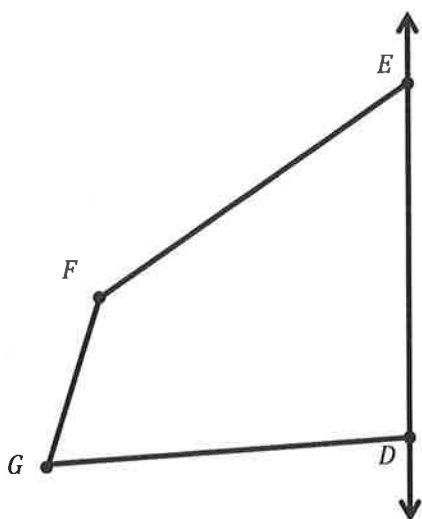
4. Stu says that quadrilateral $HIJK$ is symmetric about \overleftrightarrow{HJ} because $IL = LK$. Use your tools to determine Stu's mistake. Explain your thinking.



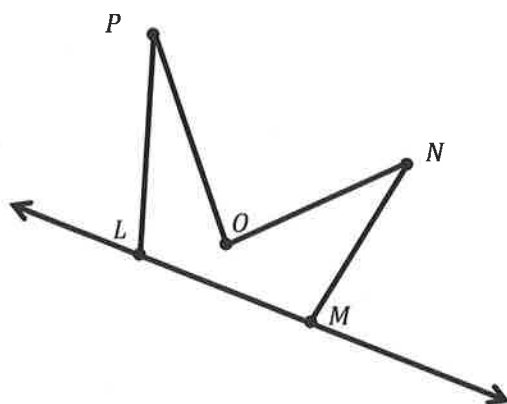
Name _____

Date _____

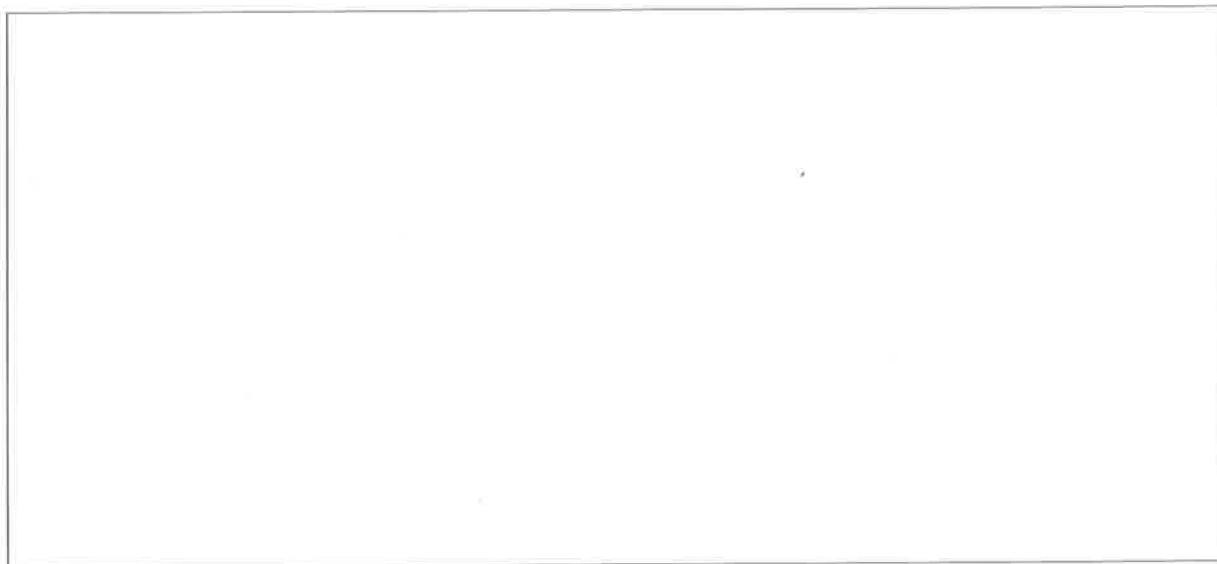
1. Draw to create a figure that is symmetric about \overleftrightarrow{DE} .



2. Draw to create a figure that is symmetric about \overleftrightarrow{LM} .



3. Complete the following construction in the space below.
- Plot 3 non-collinear points, G , H , and I .
 - Draw \overline{GH} , \overline{HI} , and \vec{IG} .
 - Plot point J , and draw the remaining sides, such that quadrilateral $GHIJ$ is symmetric about \vec{IG} .



4. In the space below, use your tools to draw a symmetric figure around a line.

Name _____

Date _____

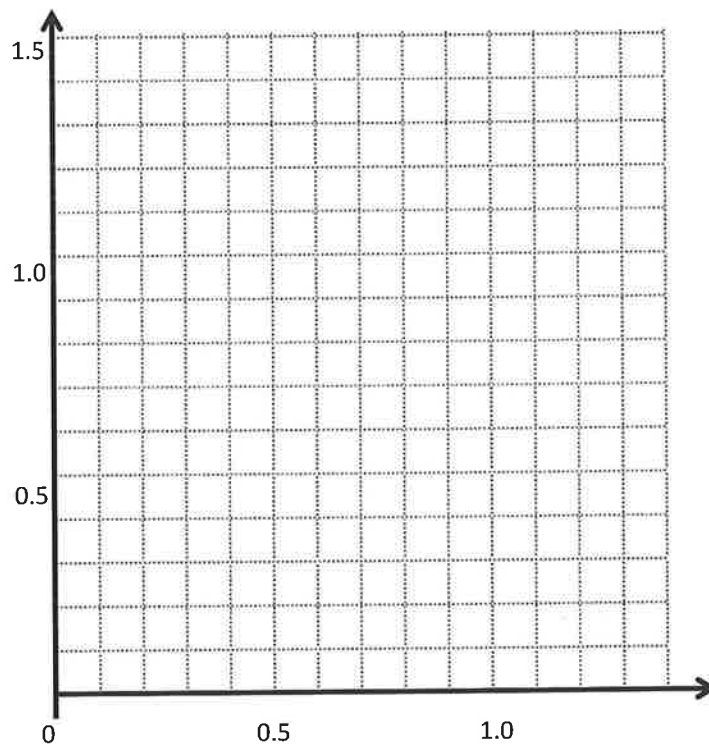
1. Use the plane at right to complete the following tasks.

- Draw a line t whose rule is, y is always 0.7 .
- Plot the points from Table A on the grid in order. Then draw line segments to connect the points.

Table A

(0.1, 0.5)
(0.2, 0.3)
(0.3, 0.5)
(0.5, 0.1)
(0.6, 0.2)
(0.8, 0.2)
(0.9, 0.1)
(1.1, 0.5)
(1.2, 0.3)
(1.3, 0.5)

Table B



- Complete the drawing to create a figure that is symmetric about line t . For each point in Table A, record the corresponding point on the other side of the line of symmetry in Table B.
- Compare the y -coordinates in Table A with those in Table B. What do you notice?
- Compare the x -coordinates in Table A with those in Table B. What do you notice?

2. This figure has a second line of symmetry. Draw the line on the plane and write the rule for this line.

3. Use the plane below to complete the following tasks.

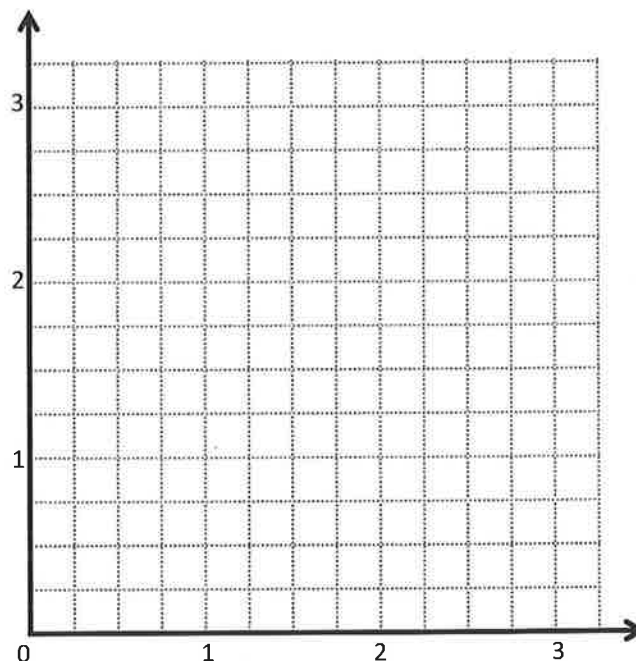
- Draw a line u whose rule is, y is equal to $x + \frac{1}{4}$.
- Construct a figure with a total of 6 points all on the same side of the line.
- Record the coordinates of each point, in the order in which they were drawn, in Table A.
- Swap your paper with a neighbor and have him or her complete Parts (e–f), below.

Table A

(x, y)

Table B

(x, y)



- Complete the drawing to create a figure that is symmetric about u . For each point in Table A, record the corresponding point on the other side of the line of symmetry in Table B.
- Explain how you found the points symmetric to your partner's about u .

Name _____

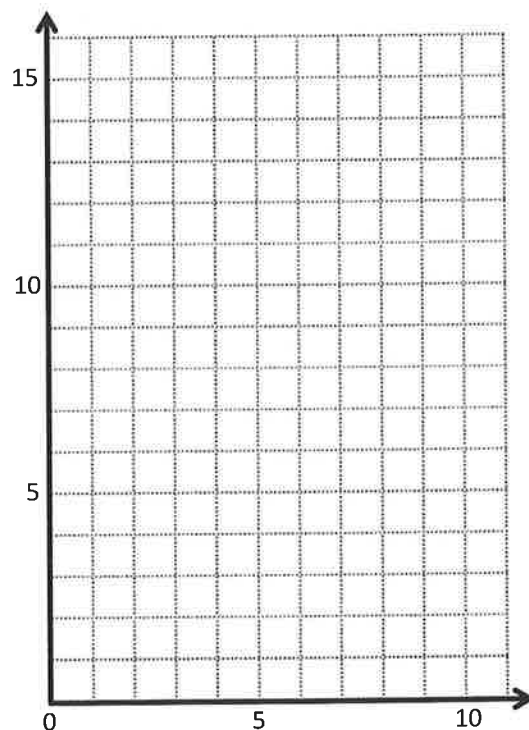
Date _____

1. Use the plane at right to complete the following tasks.
- Draw a line s whose rule is, x is always 5.
 - Plot the points from Table A on the grid in order. Then draw line segments to connect the points in order.

Table A

(1, 13)
(1, 12)
(2, 10)
(4, 9)
(4, 3)
(1, 2)
(5, 2)

Table B



- Complete the drawing to create a figure that is symmetric about line s . For each point in Table A, record the symmetric point on the other side of s .
- Compare the y -coordinates in Table A with those in Table B. What do you notice?
- Compare the x -coordinates in Table A with those in Table B. What do you notice?

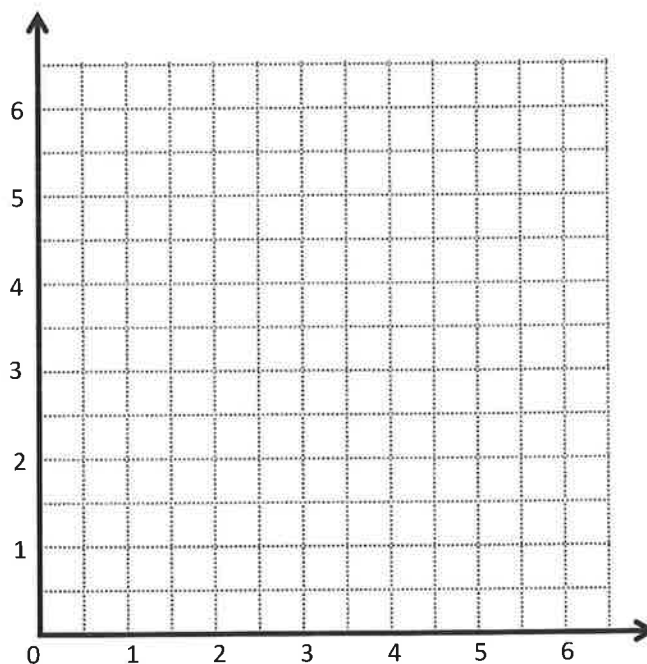
2. Use the plane at right to complete the following tasks.

- Draw a line p whose rule is, y is equal to x .
- Plot the points from Table A on the grid in order. Then draw line segments to connect the points.

Table A

$(\frac{1}{2}, \frac{1}{2})$
$(1, 2)$
$(1\frac{1}{2}, 1\frac{1}{2})$
$(2, 4)$
$(3\frac{1}{2}, 3\frac{1}{2})$
$(4, 4\frac{1}{2})$
$(5, 5)$

Table B



- Complete the drawing to create a figure that is symmetric about line p . For each point in Table A, record the symmetric point on the other side of the line p in Table B.
- Compare the y -coordinates in Table A with those in Table B. What do you notice?
- Compare the x -coordinates in Table A with those in Table B. What do you notice?

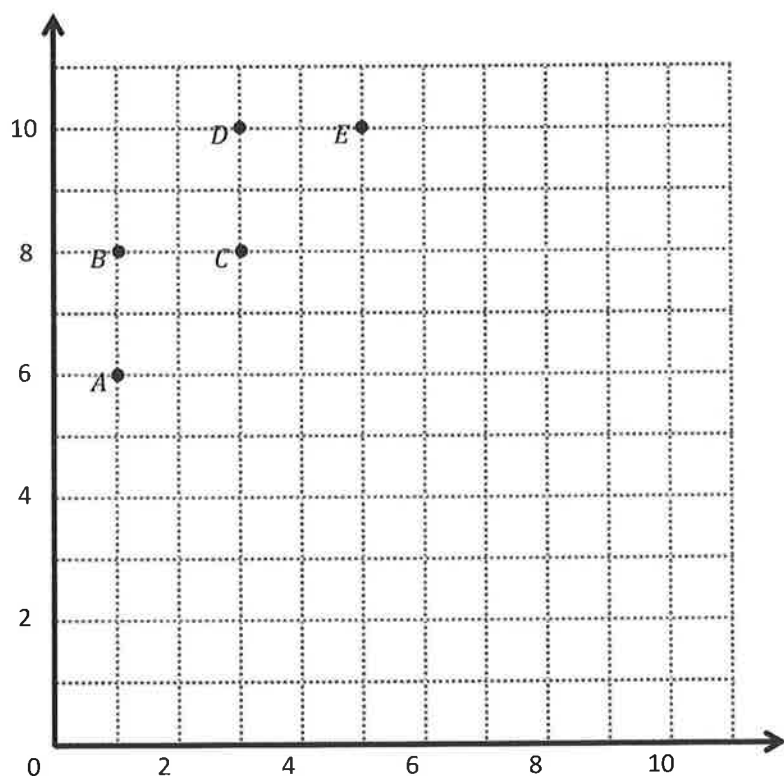


Table A

Point	(x, y)
A	
B	
C	
D	
E	

Table C

(x, y)

Table B

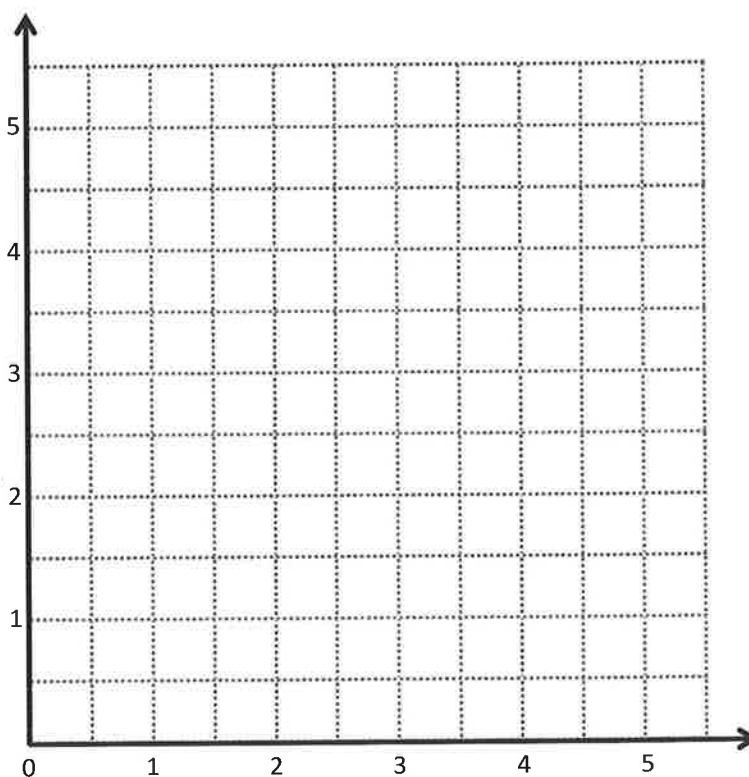
Point	(x, y)
I	
H	
G	
F	

Table D

(x, y)

Table D

Point	(x, y)
A	(1, 1)
B	$(1\frac{1}{2}, 3\frac{1}{2})$
C	(2, 3)
D	$(2\frac{1}{2}, 3\frac{1}{2})$
E	$(2\frac{1}{2}, 2\frac{1}{2})$
F	$(3\frac{1}{2}, 2\frac{1}{2})$
G	(3, 2)
H	$(3\frac{1}{2}, 1\frac{1}{2})$



A

Correct _____

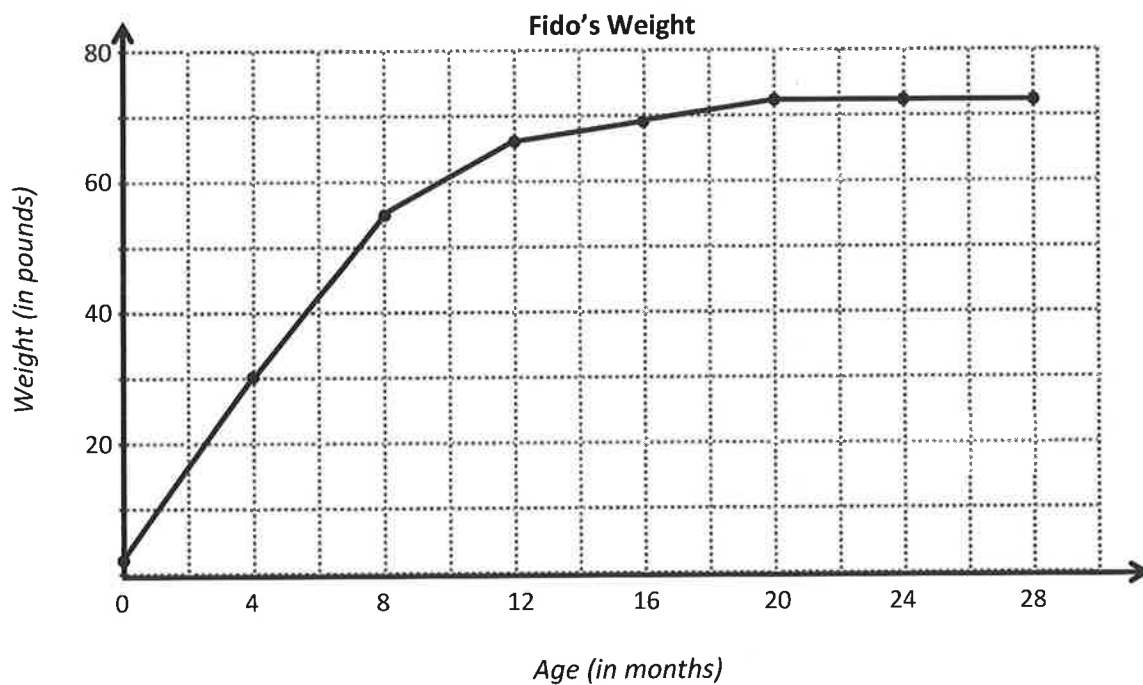
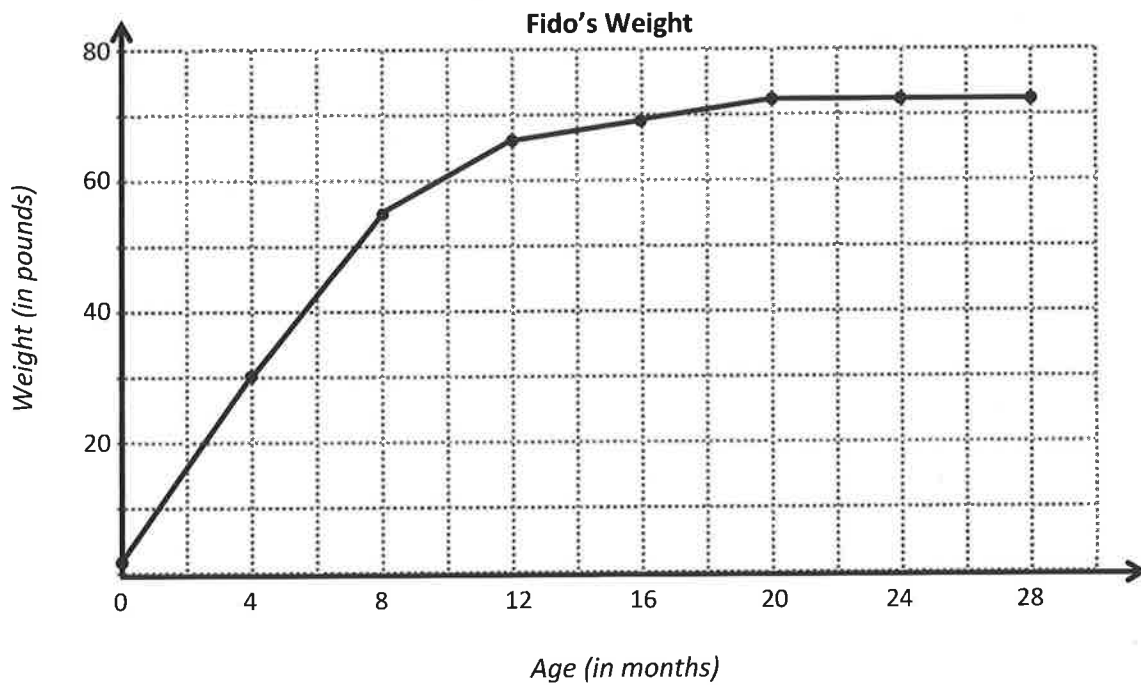
Simplify.					
1	$\frac{2}{4} =$		23	$\frac{9}{27} =$	
2	$\frac{2}{6} =$		24	$\frac{9}{63} =$	
3	$\frac{2}{8} =$		25	$\frac{8}{12} =$	
4	$\frac{5}{10} =$		26	$\frac{8}{16} =$	
5	$\frac{5}{15} =$		27	$\frac{8}{24} =$	
6	$\frac{5}{20} =$		28	$\frac{8}{64} =$	
7	$\frac{4}{8} =$		29	$\frac{12}{18} =$	
8	$\frac{4}{12} =$		30	$\frac{12}{16} =$	
9	$\frac{4}{16} =$		31	$\frac{9}{12} =$	
10	$\frac{3}{6} =$		32	$\frac{6}{8} =$	
11	$\frac{3}{9} =$		33	$\frac{10}{12} =$	
12	$\frac{3}{12} =$		34	$\frac{15}{18} =$	
13	$\frac{4}{6} =$		35	$\frac{8}{10} =$	
14	$\frac{6}{12} =$		36	$\frac{16}{20} =$	
15	$\frac{6}{18} =$		37	$\frac{12}{15} =$	
16	$\frac{6}{30} =$		38	$\frac{18}{27} =$	
17	$\frac{6}{9} =$		39	$\frac{27}{36} =$	
18	$\frac{7}{14} =$		40	$\frac{32}{40} =$	
19	$\frac{7}{21} =$		41	$\frac{45}{54} =$	
20	$\frac{7}{42} =$		42	$\frac{24}{36} =$	
21	$\frac{8}{12} =$		43	$\frac{60}{72} =$	
22	$\frac{9}{18} =$		44	$\frac{48}{60} =$	

B

Improvement _____

Correct _____

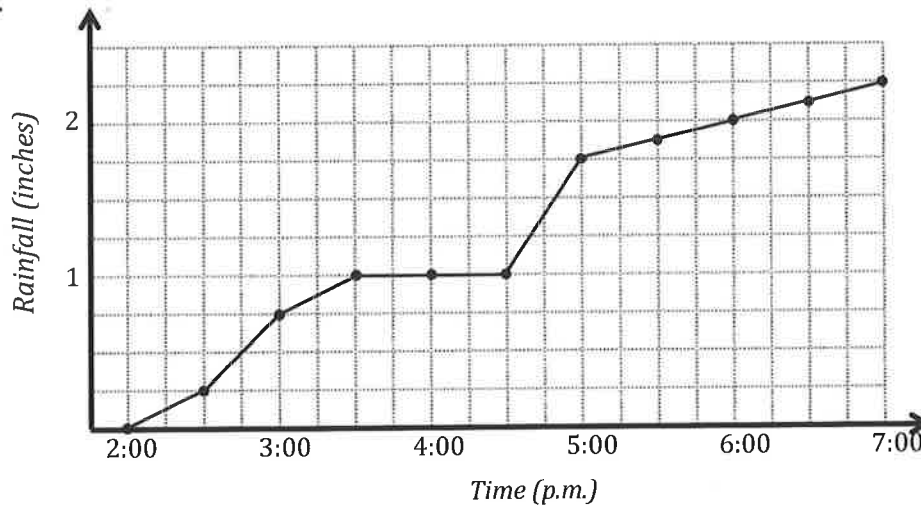
1	$\frac{5}{10} =$		23	$\frac{8}{24} =$	
2	$\frac{5}{15} =$		24	$\frac{8}{56} =$	
3	$\frac{5}{20} =$		25	$\frac{8}{12} =$	
4	$\frac{2}{4} =$		26	$\frac{9}{18} =$	
5	$\frac{2}{6} =$		27	$\frac{9}{27} =$	
6	$\frac{2}{8} =$		28	$\frac{9}{72} =$	
7	$\frac{3}{6} =$		29	$\frac{12}{18} =$	
8	$\frac{3}{9} =$		30	$\frac{6}{8} =$	
9	$\frac{3}{12} =$		31	$\frac{9}{12} =$	
10	$\frac{4}{8} =$		32	$\frac{12}{16} =$	
11	$\frac{4}{12} =$		33	$\frac{8}{10} =$	
12	$\frac{4}{16} =$		34	$\frac{16}{20} =$	
13	$\frac{4}{6} =$		35	$\frac{12}{15} =$	
14	$\frac{7}{14} =$		36	$\frac{10}{12} =$	
15	$\frac{7}{21} =$		37	$\frac{15}{18} =$	
16	$\frac{7}{35} =$		38	$\frac{16}{24} =$	
17	$\frac{6}{9} =$		39	$\frac{24}{32} =$	
18	$\frac{6}{12} =$		40	$\frac{36}{45} =$	
19	$\frac{6}{18} =$		41	$\frac{40}{48} =$	
20	$\frac{6}{36} =$		42	$\frac{24}{36} =$	
21	$\frac{8}{12} =$		43	$\frac{48}{60} =$	
22	$\frac{8}{16} =$		44	$\frac{60}{72} =$	



Name _____

Date _____

1. The line graph below tracks the rain accumulation, measured every half hour, during a rainstorm that began at 2:00 p.m. and ended at 7:00 p.m. Use the information in the graph to answer the questions that follow.



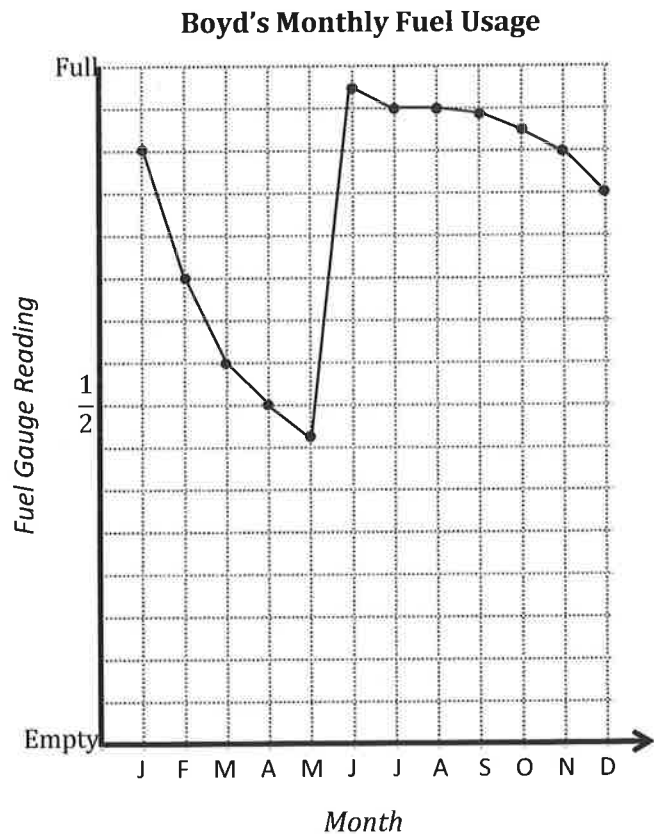
- How many inches of rain fell during this five-hour period?
- During which half-hour period did $\frac{1}{2}$ inch rain fall? Explain how you know.
- During which half-hour period did rain fall most rapidly? Explain how you know.
- Why do you think the line is horizontal between 3:30 p.m. and 4:30 p.m.?
- For every inch of rain that fell here, a nearby community in the mountains received a foot and a half of snow. How many inches of snow fell in the mountain community between 5:00 p.m. and 7:00 p.m.?

2. Mr. Boyd checks the gauge on his home's fuel tank on the first day of every month. The line graph at right was created using the data he collected.

a. According to the graph, during which month(s) does the amount of fuel decrease most rapidly?

b. The Boyds took a month-long vacation. During which month did this most likely occur? Explain how you know using the data in the graph.

c. Mr. Boyd's fuel company filled his tank once this year. During which month did this most likely occur? Explain how you know.



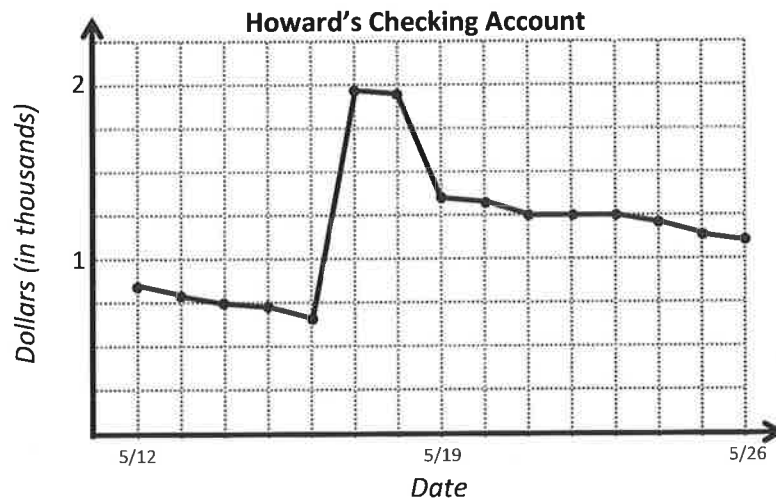
d. The Boyd family's fuel tank holds 284 gallons of fuel when full. How many gallons of fuel did the Boyds use in February?

e. Mr. Boyd pays \$3.54 per gallon of fuel. What is the cost of the fuel used in February and March?

Name _____

Date _____

1. The line graph below tracks the balance of Howard's checking account, at the end of each day, between May 12 and May 26. Use the information in the graph to answer the questions that follow.



- About how much money does Howard have in his checking account on May 21?
- If Howard spends \$250 from his checking account on May 26, about how much money will he have left in his account?
- Explain what happened with Howard's money between May 21 and May 23.
- Howard received a payment from his job that went directly into his checking account. On which day did this most likely occur? Explain how you know.
- Howard bought a new television during the time shown in the graph. On which day did this most likely occur? Explain how you know.

A Subtract. Give each answer as a mixed number in its simplest form.

Correct _____

1	$4 - \frac{1}{2} =$		23	$3 - \frac{1}{8} =$	
2	$3 - \frac{1}{2} =$		24	$3 - \frac{3}{8} =$	
3	$2 - \frac{1}{2} =$		25	$3 - \frac{5}{8} =$	
4	$1 - \frac{1}{2} =$		26	$3 - \frac{7}{8} =$	
5	$1 - \frac{1}{3} =$		27	$2 - \frac{7}{8} =$	
6	$2 - \frac{1}{3} =$		28	$4 - \frac{1}{7} =$	
7	$4 - \frac{1}{3} =$		29	$3 - \frac{6}{7} =$	
8	$4 - \frac{2}{3} =$		30	$2 - \frac{3}{7} =$	
9	$2 - \frac{2}{3} =$		31	$4 - \frac{4}{7} =$	
10	$2 - \frac{1}{4} =$		32	$3 - \frac{5}{7} =$	
11	$2 - \frac{3}{4} =$		33	$4 - \frac{3}{4} =$	
12	$3 - \frac{3}{4} =$		34	$2 - \frac{5}{8} =$	
13	$3 - \frac{1}{4} =$		35	$3 - \frac{3}{10} =$	
14	$4 - \frac{3}{4} =$		36	$4 - \frac{2}{5} =$	
15	$2 - \frac{1}{10} =$		37	$4 - \frac{3}{7} =$	
16	$3 - \frac{9}{10} =$		38	$3 - \frac{7}{10} =$	
17	$2 - \frac{7}{10} =$		39	$3 - \frac{5}{10} =$	
18	$4 - \frac{3}{10} =$		40	$4 - \frac{2}{8} =$	
19	$3 - \frac{1}{5} =$		41	$2 - \frac{9}{12} =$	
20	$3 - \frac{2}{5} =$		42	$4 - \frac{2}{12} =$	
21	$3 - \frac{4}{5} =$		43	$3 - \frac{2}{6} =$	
22	$3 - \frac{3}{5} =$		44	$2 - \frac{8}{12} =$	

B Subtract. Give each answer as a mixed number in its simplest form.

Improvement _____

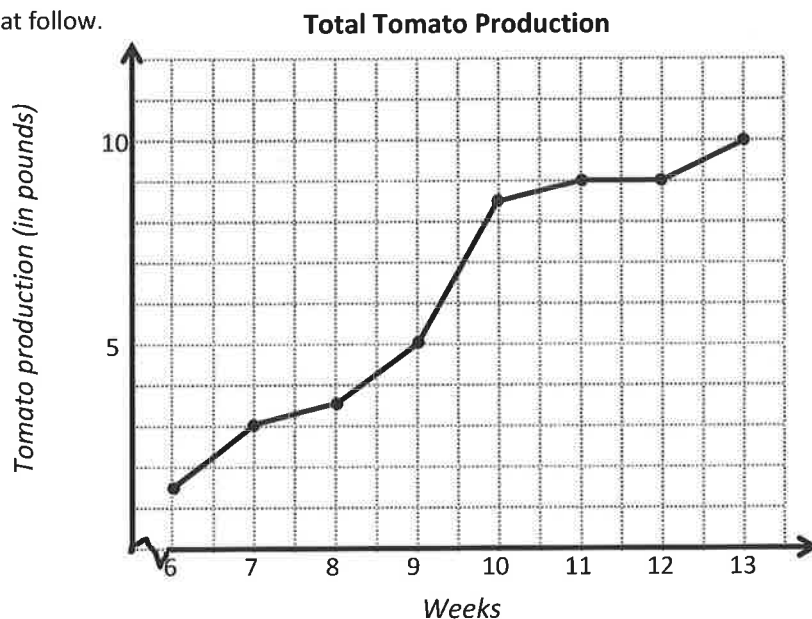
Correct _____

1	$1 - \frac{1}{2} =$		23	$2 - \frac{1}{8} =$	
2	$2 - \frac{1}{2} =$		24	$2 - \frac{3}{8} =$	
3	$3 - \frac{1}{2} =$		25	$2 - \frac{5}{8} =$	
4	$4 - \frac{1}{2} =$		26	$2 - \frac{7}{8} =$	
5	$1 - \frac{1}{4} =$		27	$4 - \frac{7}{8} =$	
6	$2 - \frac{1}{4} =$		28	$3 - \frac{1}{7} =$	
7	$4 - \frac{1}{4} =$		29	$2 - \frac{6}{7} =$	
8	$4 - \frac{3}{4} =$		30	$4 - \frac{3}{7} =$	
9	$2 - \frac{3}{4} =$		31	$3 - \frac{4}{7} =$	
10	$2 - \frac{1}{3} =$		32	$2 - \frac{5}{7} =$	
11	$2 - \frac{2}{3} =$		33	$3 - \frac{3}{4} =$	
12	$3 - \frac{2}{3} =$		34	$4 - \frac{5}{8} =$	
13	$3 - \frac{1}{3} =$		35	$2 - \frac{3}{10} =$	
14	$4 - \frac{2}{3} =$		36	$3 - \frac{2}{5} =$	
15	$3 - \frac{1}{10} =$		37	$3 - \frac{3}{7} =$	
16	$2 - \frac{9}{10} =$		38	$2 - \frac{7}{10} =$	
17	$4 - \frac{7}{10} =$		39	$2 - \frac{5}{10} =$	
18	$3 - \frac{3}{10} =$		40	$3 - \frac{6}{8} =$	
19	$2 - \frac{1}{5} =$		41	$4 - \frac{3}{12} =$	
20	$2 - \frac{2}{5} =$		42	$3 - \frac{10}{12} =$	
21	$2 - \frac{4}{5} =$		43	$2 - \frac{4}{6} =$	
22	$3 - \frac{3}{5} =$		44	$4 - \frac{4}{12} =$	

Name _____

Date _____

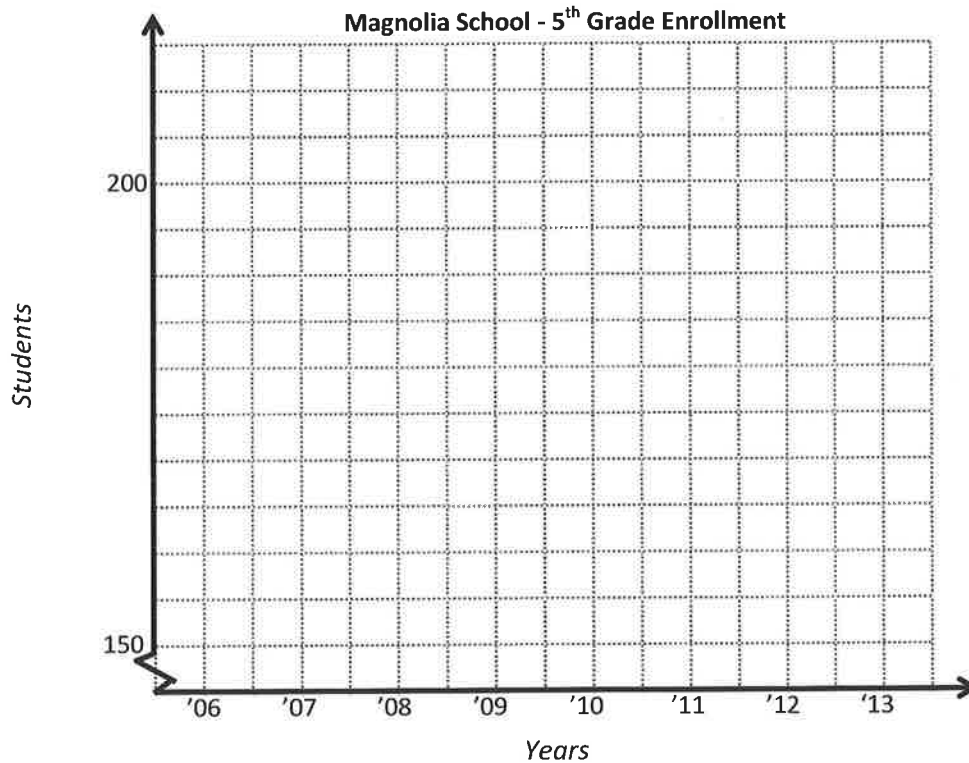
1. The line graph below tracks the total tomato production for one tomato plant. The total tomato production is plotted at the end of each of 8 weeks. Use the information in the graph to answer the questions that follow.



- How many pounds of tomatoes did this plant produce at the end of 13 weeks?
- How many pounds of tomatoes did this plant produce from Week 7 to Week 11? Explain how you know.
- Which one-week period showed the greatest change in tomato production? The least? Explain how you know.
- During Weeks 6–8, Jason fed the tomato plant just water. During Weeks 8–10, he used a mixture of water and Fertilizer A, and in Weeks 10–13 he used water and Fertilizer B on the tomato plant. Compare the tomato production for these periods of time.

2. Use the story context below to sketch a line graph. Then answer the questions that follow.

The number of fifth-grade students attending Magnolia School has changed over time. The school opened in 2006, with 156 students in the fifth grade. The student population grew the same amount each year before reaching its largest class of 210 students in 2008. The following year, Magnolia lost one-seventh of its fifth-graders. In 2010, the enrollment dropped to 154 students and remained constant in 2011. For the next two years, the enrollment grew by 7 students each year.



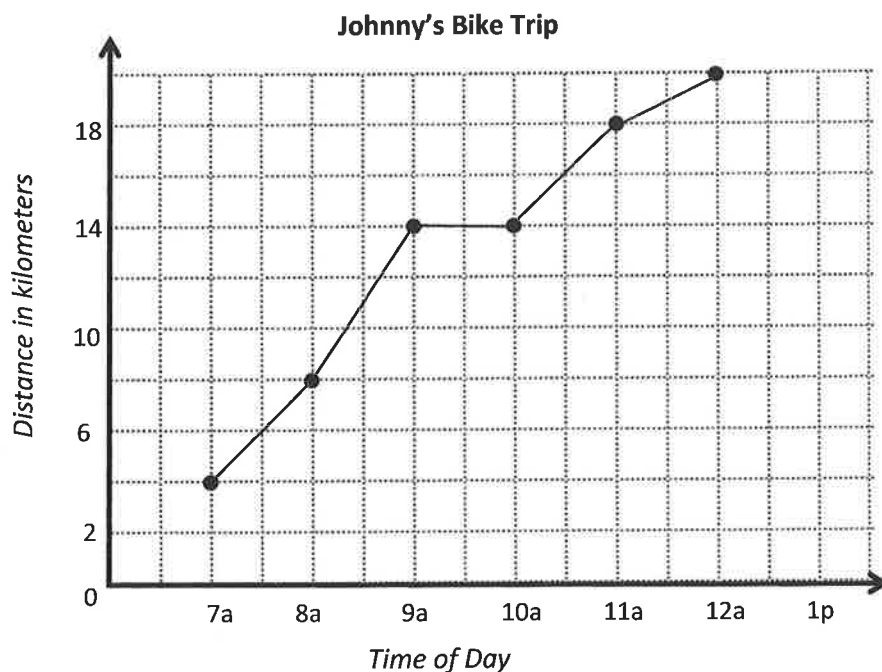
- How many more fifth-grade students attend Magnolia in 2009 than in 2013?
- Between which two years was there the greatest change in student population?
- If the fifth-grade population continues to grow in the same pattern as in 2012 and 2013, in what year will the number of students match 2008's enrollment?

Name _____

Date _____

1. Use the graph to answer the questions.

Johnny left his home at 6 a.m. and kept track of the number of kilometers he traveled at the end of each hour of his trip. He recorded the data in a line graph.



- a. How far did Johnny travel in all? How long did it take?
- b. Johnny took a one-hour break to have a snack and take some pictures. What time did he stop?
How do you know?

- c. Did Johnny cover more distance before his break or after? Explain.
- d. Between which two hours did Johnny ride 4 kilometers?
- e. Which hour did Johnny ride the fastest? Explain how you know.

Exit Slips

Name _____

Date _____

1. Write an equivalent expression in numerical form.

A fourth as much as the product of two-thirds and 0.8

2. Write an equivalent expression in word form.

a. $\frac{3}{8} \times (1 - \frac{1}{3})$

b. $(1 - \frac{1}{3}) \div 2$

3. Compare the expressions in 2(a) and 2(b). Without evaluating, determine which expression is greater, and explain how you know.



Lesson 32:

Date:

Interpret and evaluate numerical expressions including the language of scaling and fraction division.
11/10/13

engage^{ny}

4.H.13

Name _____

Date _____

1. An entire commercial break is 3.6 minutes.

a. If each commercial takes 0.6 minutes, how many commercials will be played?

b. A different commercial break of the same length plays commercials half as long. How many commercials will play during this break?

Name _____

Date _____

1. Use number line ℓ to answer the questions.



- a. Plot point C so its distance from the origin is 1.
- b. Plot point E $\frac{4}{5}$ closer to the origin than C . What is its coordinate? _____
- c. Plot a point at the midpoint of C and E . Label it H .

Name _____

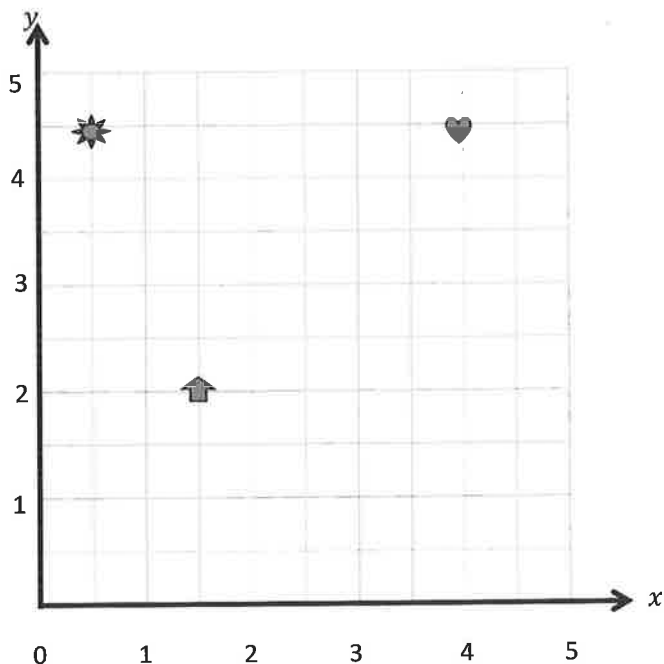
Date _____

1. Name the coordinates of the shapes below.

Shape	x -coordinate	y -coordinate
Sun		
Arrow		
Heart		

2. Plot a square at $(3, 3\frac{1}{2})$.

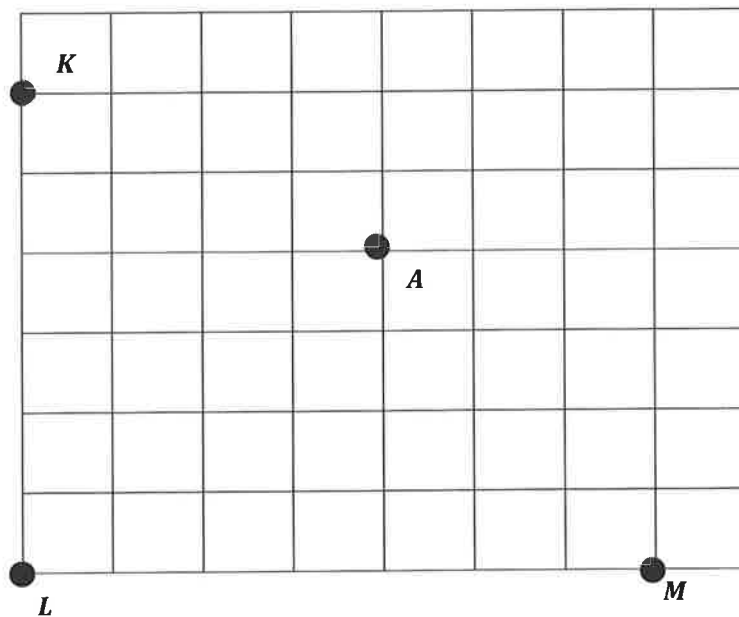
3. Plot a triangle at $(4\frac{1}{2}, 1)$.



Name _____

Date _____

1. Use a ruler on the grid below to construct the axes for a coordinate plane. The x -axis should intersect points L and M . Construct the y -axis so that it contains points K and L . Label each axis.



- Place a hash mark on each grid line on the x - and y -axis.
- Label each hash mark so that A is located at $(1, 1)$.
- Plot the following points:

Point	x -coordinate	y -coordinate
B	$\frac{1}{4}$	0
C	$1\frac{1}{4}$	$\frac{3}{4}$

Name _____

Date _____

1. Use a straightedge to construct a line that goes through points A and B . Label the line ℓ .
2. Which axis is parallel to line ℓ ?

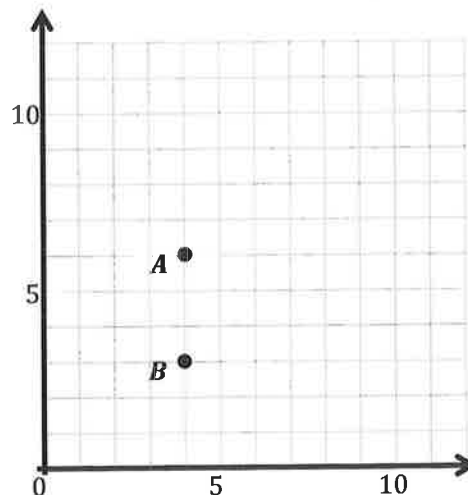
Which axis is perpendicular to line ℓ ?
3. Plot two more points on line ℓ . Name them C and D .
4. Give the coordinates of each point below.

A : _____

B : _____

C : _____

D : _____

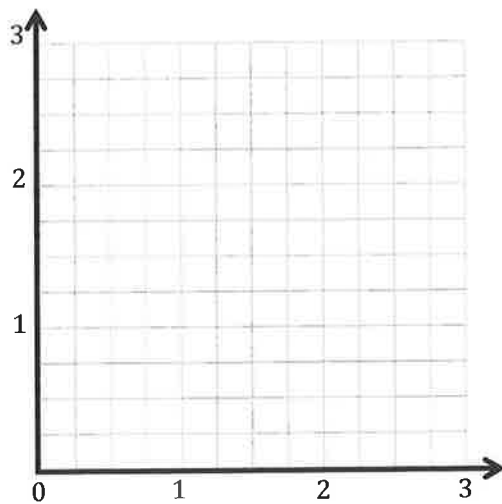


5. Give the coordinates of another point that falls on line ℓ with a y -coordinate greater than 20.

Name _____

Date _____

1. Plot the point $H(2\frac{1}{2}, 1\frac{1}{2})$.
2. Line ℓ passes through point H and is parallel to the y -axis. Construct line ℓ .
3. Construct line m such that the y -coordinate of every point is $\frac{3}{4}$.
4. Line m is _____ units from the x -axis.
5. Give the coordinates of the point on line m that is $\frac{1}{2}$ unit from the y -axis.
6. With a blue pencil, shade the portion of the plane that is less than $\frac{3}{4}$ units from the x -axis.
7. With a red pencil, shade the portion of the plane that is less than $2\frac{1}{2}$ units from the y -axis.
8. Plot a point that lies in the double-shaded region. Give the coordinates of the point.

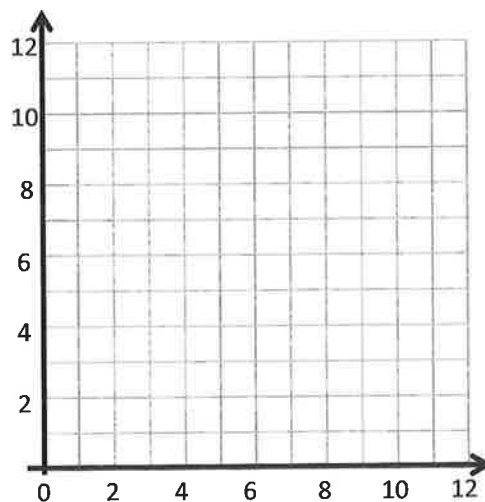


Name _____

Date _____

Complete the chart. Then, plot the points on the coordinate plane.

x	y	(x, y)
0	4	
2	6	
3	7	
7	11	



1. Use a straightedge to draw a line connecting these points.
2. Write a rule to show the relationship between the x - and y - coordinates for points on the line.
3. Name two other points that are also on this line.

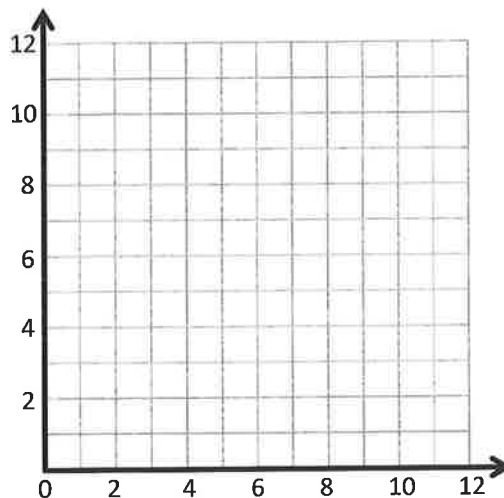
Name _____

Date _____

1. Complete this table with values for x and y such that each y -coordinate is 5 more than 2 times as much as its corresponding x -coordinate.

x	y	(x, y)
0		
2		
3.5		

- Plot each point on the coordinate plane.
- Use a straightedge to draw a line connecting these points.
- Name 2 other points that fall on this line with y -coordinates greater than 25.



Name _____

Date _____

Complete the tables for the given rules. Then, construct lines ℓ and m on the coordinate plane.

Line ℓ

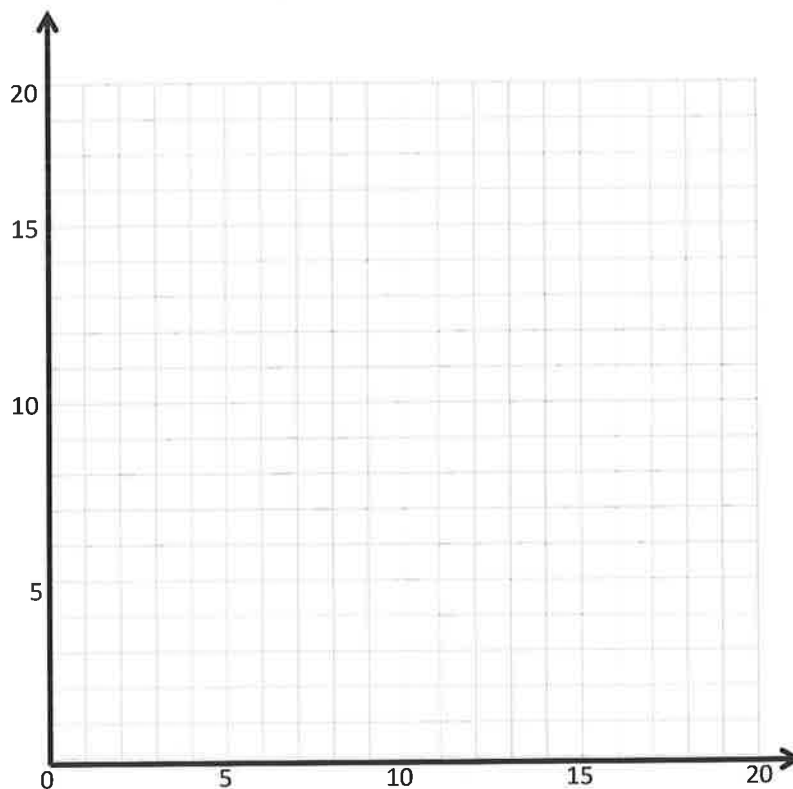
Rule: y is 5 more than x

x	y	(x, y)
0		
1		
2		
4		

Line m

Rule: y is 5 times as much as x

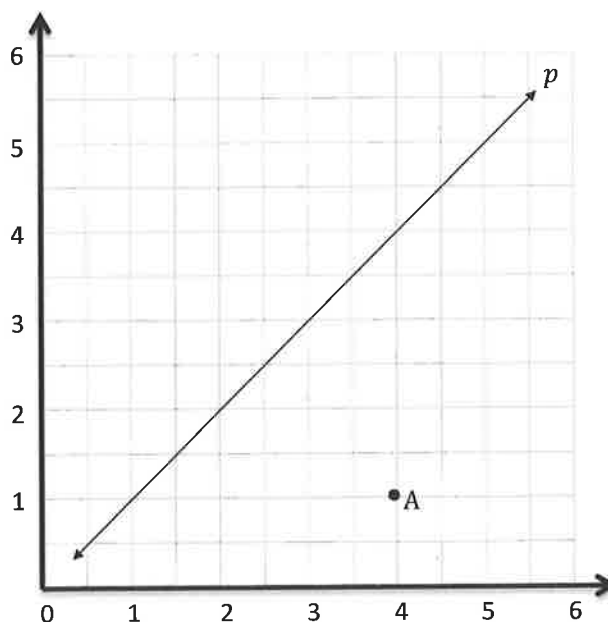
x	y	(x, y)
0		
1		
2		
4		



Name _____

Date _____

1. Use the coordinate plane below to complete the following tasks.
 - a. Line p represents the rule x and y are equal.
 - b. Construct a line, a , that is parallel to line p and contains point A .
 - c. Name 3 points on line a .



- d. Identify a rule to describe line a .

Name _____

Date _____

1. Complete the tables for the given rules.

Line ℓ

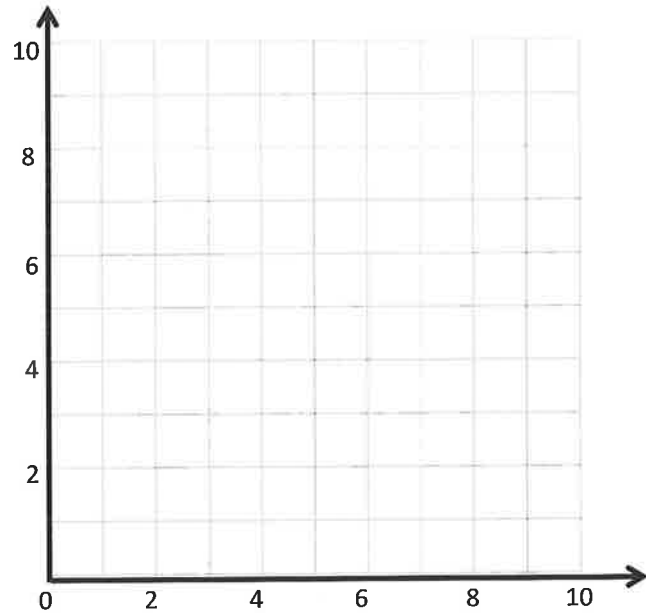
Rule: Double x

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: Double x , then add 1

x	y	(x, y)
0		
1		
2		
3		



- Draw each line on the coordinate plane above.
- Compare and contrast these lines.

2. Circle the point(s) that the line for rule *multiply by $\frac{1}{3}$ then add 1* would contain.

$(0, \frac{1}{2})$

$(1, 1\frac{1}{3})$

$(2, 1\frac{2}{3})$

$(3, 2\frac{1}{2})$

Name _____

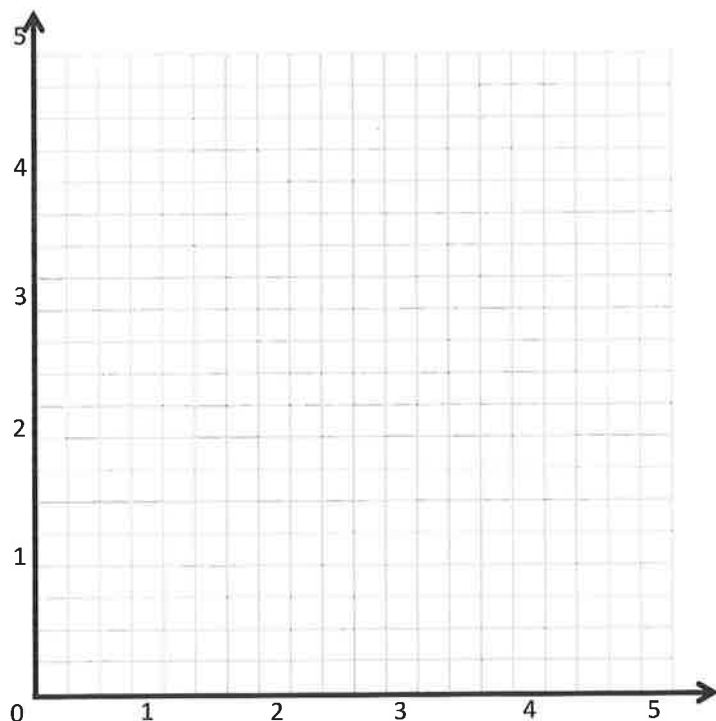
Date _____

1. Write the rule for the line that contains the points $(0, 1\frac{1}{2})$ and $(1\frac{1}{2}, 3)$.

- a. Identify 2 more points on this line, then draw it on the grid below.

Point	x	y	(x, y)
B			
C			

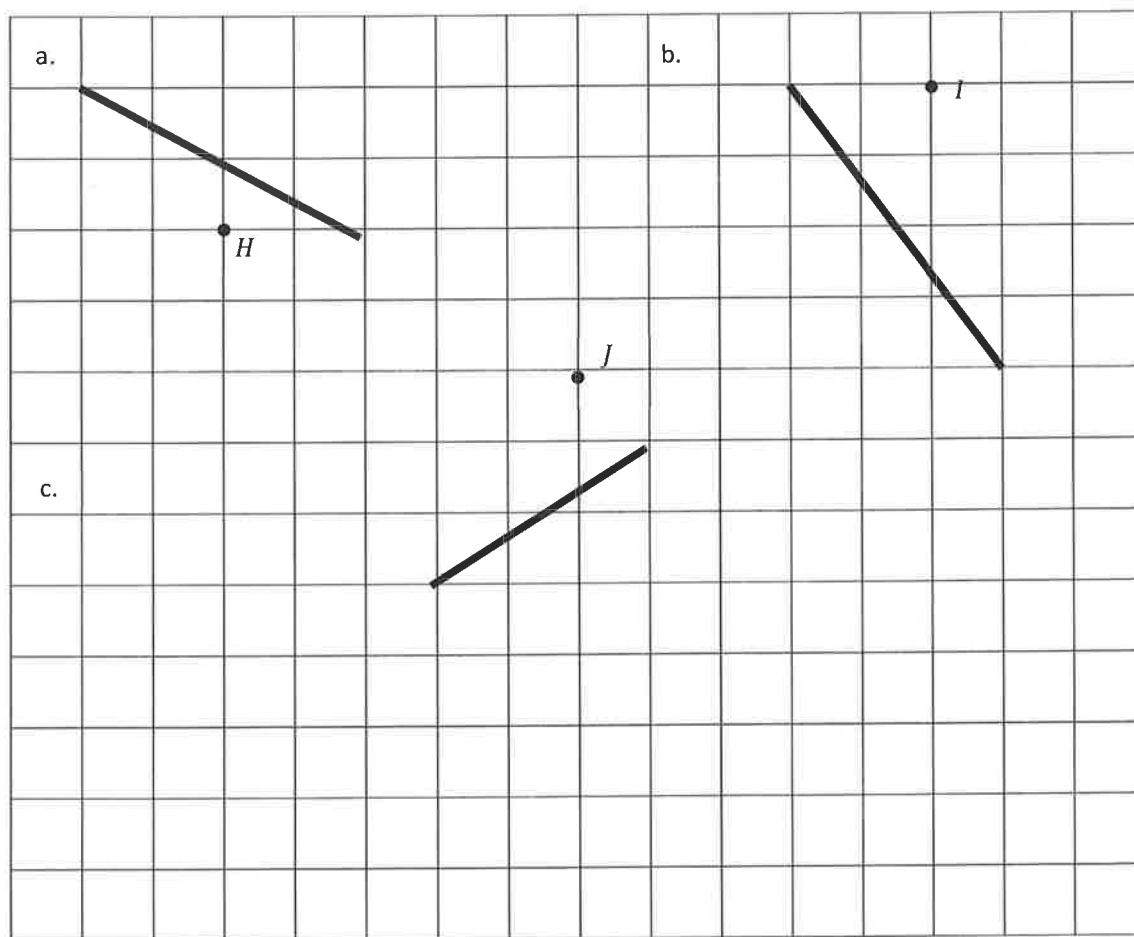
- b. Write a rule for a line that is parallel to \overrightarrow{BC} and goes through point $(1, \frac{1}{2})$.



Name _____

Date _____

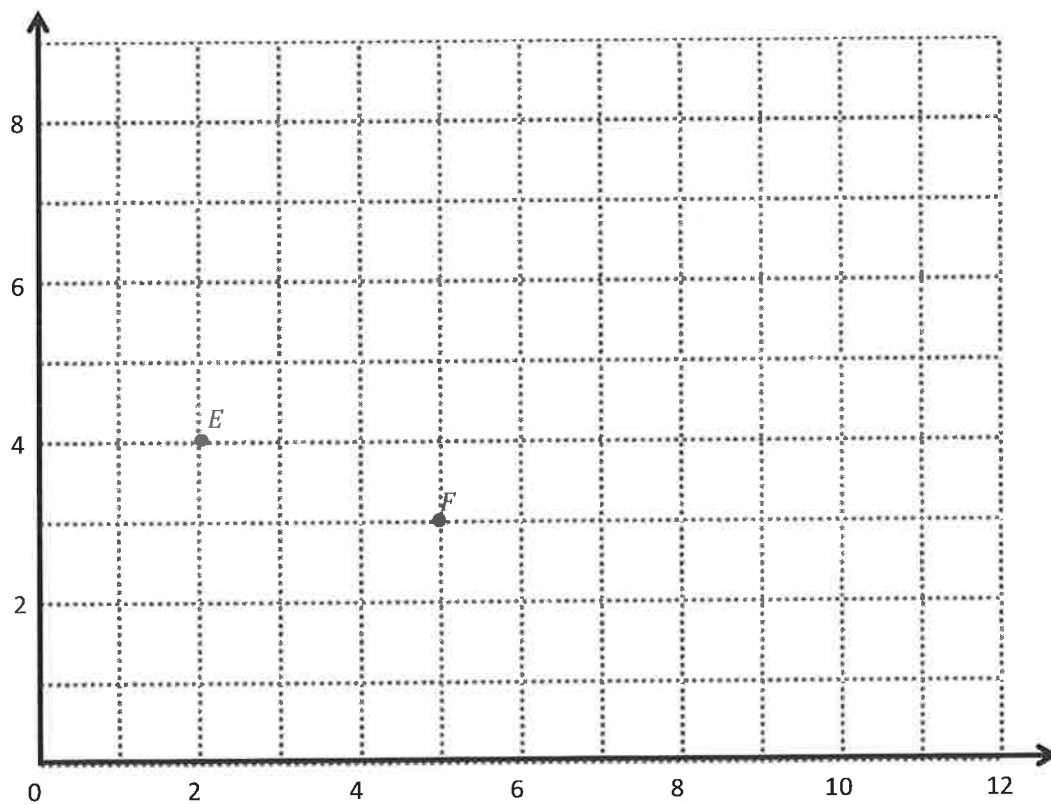
1. Use your straightedge to draw a segment parallel to each segment through the given point.



Name _____

Date _____

1. Use the coordinate plane below to complete the following tasks.

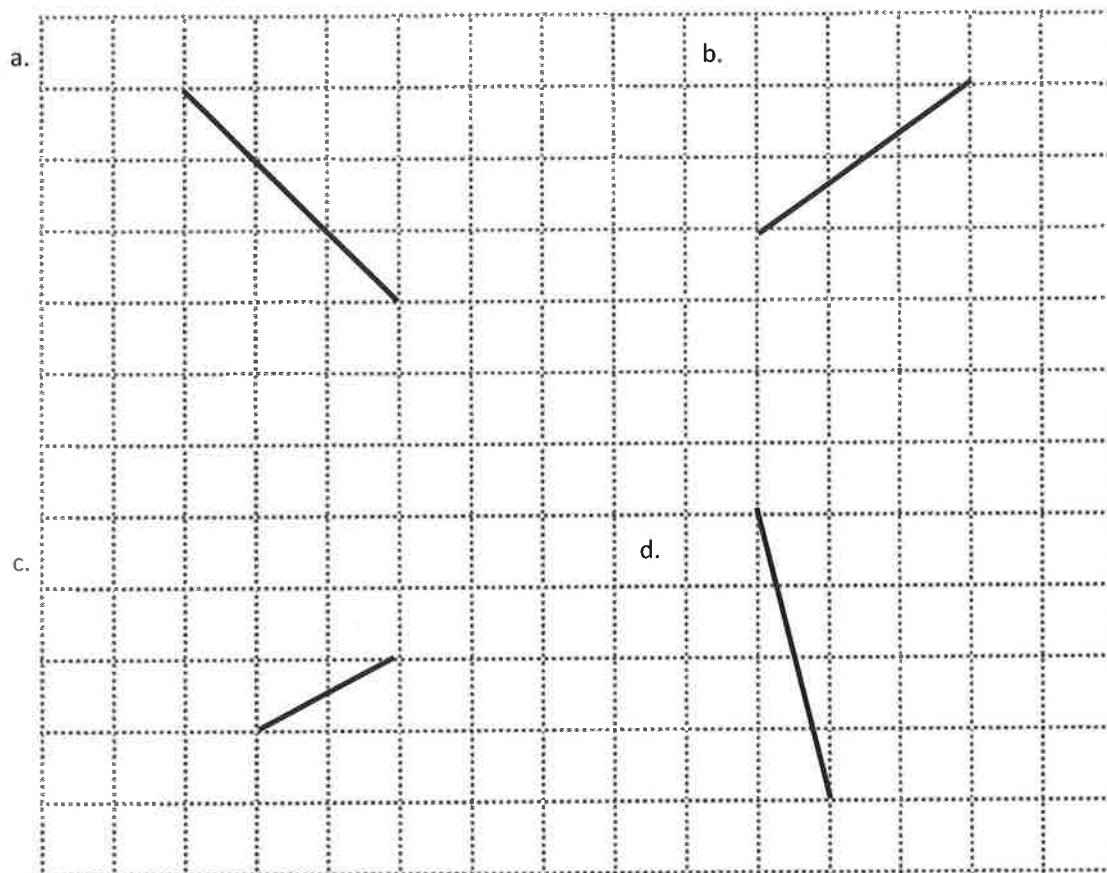


- a. Identify the locations of E and F . E : (____, ____) F : (____, ____)
- b. Draw \overrightarrow{EF} .
- c. Generate coordinate pairs for L and M , such that $\overrightarrow{EF} \parallel \overrightarrow{LM}$.
 L : (____, ____) M : (____, ____)
- d. Draw \overrightarrow{LM} .

Name _____

Date _____

1. Draw a segment perpendicular to each given segment. Show your thinking by sketching triangles as needed.

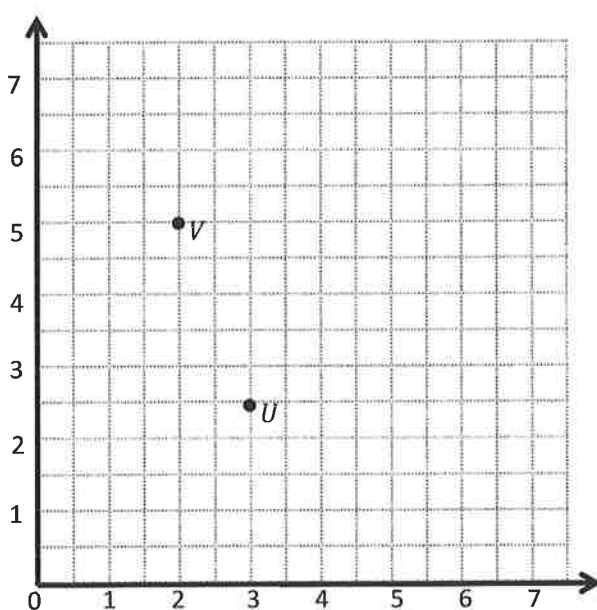


Name _____

Date _____

1. Show your thinking on the plane.

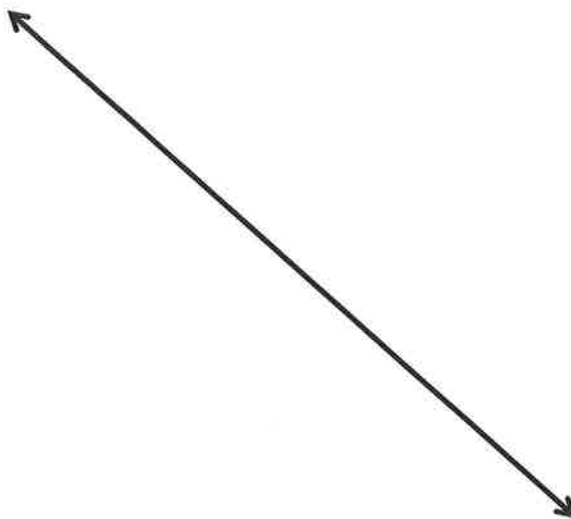
- Draw \overline{UV} .
- Plot point W ($4\frac{1}{2}$, 6).
- Draw \overline{VW} .
- Explain how you know that $\angle UVW$ is a right angle without measuring it.



Name _____

Date _____

1. Draw 2 points on one side of the line below and label them T and U .
2. Use your set square and ruler to draw symmetrical points about your line that correspond to T and U and label them V and W .



Name _____

Date _____

1. Kenny plotted the following pairs of points and said they made a symmetric figure about a line with the rule:

y is always 4.

(3, 2) and (3, 6)

(4, 3) and (5, 5)

$(5, \frac{3}{4})$ and $(5, 7\frac{1}{4})$

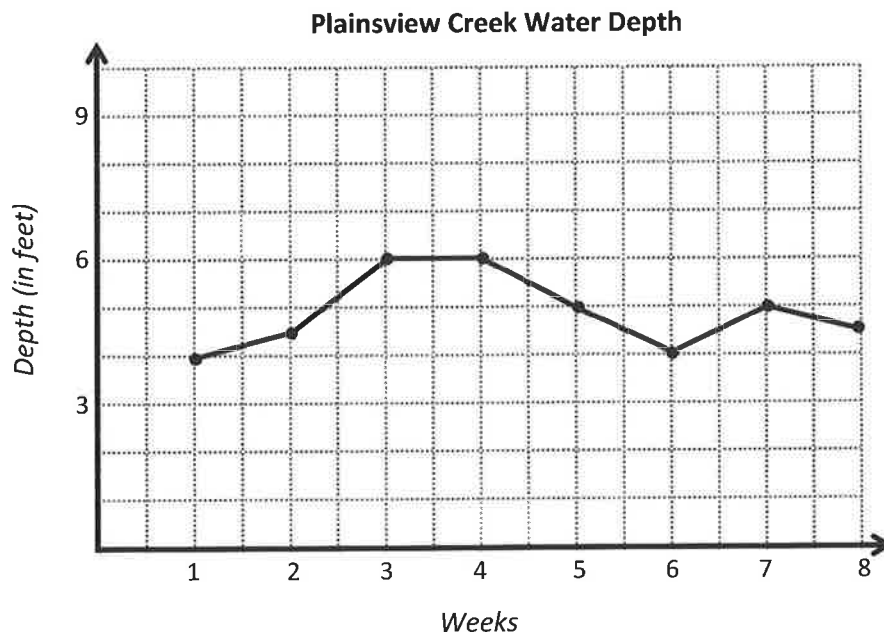
$(7, 1\frac{1}{2})$ and $(7, 6\frac{1}{2})$

Is his figure symmetrical about the line? How do you know?

Name _____

Date _____

1. The line graph below tracks the water level of Plainsview Creek, measured each Sunday, for 8 weeks. Use the information in the graph to answer the questions that follow.



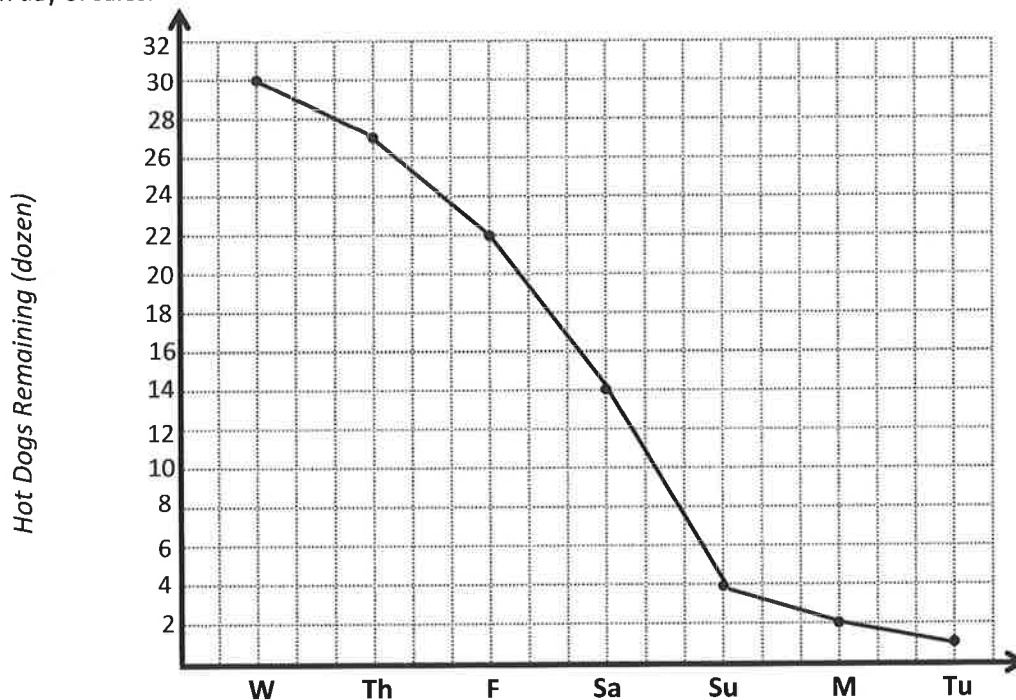
- a. About how many feet deep was the creek in Week 1? _____
- b. According to the graph, which week had the greatest change in water depth? _____
- c. It rained hard throughout the sixth week. During what other weeks might it have rained? Explain why you think so.
- d. What might have been another cause leading to an increase in the depth of the creek?

Name _____

Date _____

1. Use the following information to complete the line graph below. Then answer the questions that follow.

Harry runs a hot dog stand at the county fair. When he arrived on Wednesday, he had 38 dozen hot dogs on his stand. The graph shows the number of hot dogs (in dozens) that remained unsold at the end of each day of sales.



- How many dozen hot dogs did Harry sell on Wednesday? How do you know?
- Between which two-day period did the number of hot dogs sold change the most? Explain how you determined your answer.
- During which three days did Harry sell the most hot dogs?
- How many dozens of hot dogs were sold on these three days?